



Presented to
The Library
of the
University of Toronto

by
William Lash Miller, B.Sc., Ph.D.,
C.B.F.
Professor Emeritus
of
Physical Chemistry

HANDBOUND
AT THE



UNIVERSITY OF
TORONTO PRESS

hem & Rys
c

INDEX

TO THE

FIRST TWENTY-FIVE VOLUMES

OF THE

Journal of the Chemical Society,

1848—1872 ;

AND TO THE

Memoirs and Proceedings,

1841—1847.

COMPILED BY

HENRY WATTS, B.A., F.R.S., F.C.S.,

Editor of the Journal.

===== 360565 -
24. 1. 39.

LONDON :

J. VAN VOORST, 1, PATERNOSTER ROW.

1874.

QD

1

C6

Index

1841-72

cop-2

THE dates of the several volumes are as follows:—

MEMOIRS AND PROCEEDINGS.

Vol. I	1841—1843
„ II	1843—1845
„ III	1845—1847

JOURNAL.

Entire Series.	Date.	Entire Series.	Second Series.	Date.
Vol. 1	1848	Vol. 16	Vol. 1	1863
„ 2	1849	„ 17	„ 2	1864
„ 3	1850	„ 18	„ 3	1865
„ 4	1851	„ 19	„ 4	1866
„ 5	1852	„ 20	„ 5	1867
„ 6	1853	„ 21	„ 6	1868
„ 7	1854	„ 22	„ 7	1869
„ 8	1855	„ 23	„ 8	1870
„ 9	1856	„ 24	„ 9	1871
„ 10	1857	„ 25	„ 10	1872
„ 11	1858			
„ 12	1859			
„ 13	1860			
„ 14	1861			
„ 15	1862			

The Arabic Numerals, in thick type, refer to the volumes of the Journal, **1—25**; the Roman Numerals, **i, ii, iii**, to the three volumes of Memoirs and Proceedings. The Proceedings in vol. **i**, which are paged separately from the Memoirs, are distinguished by the letter (p).

INDEX OF NAMES.

A.

- Aarland, G., and E. Carstanjen, electrolysis of itaconic acid, **25**, 144.
- Abel, F. A., account of recent researches on the application of electricity, from different sources, to the explosion of gunpowder, **14**, 165.
- crystallised binocide of tin, **10**, 109.
- composition of some varieties of foreign iron, **9**, 202.
- composition of some varieties of native copper, **16**, 89.
- compounds of copper and phosphorus, **18**, 249.
- contributions to the history of explosive agents, **23**, 111.
- curious instance of electrolytic action, **16**, 235.
- existence of considerable deposits of crystallised phosphate of lime in teak wood, **15**, 91.
- fuzes for firing gunpowder with electro-magnetic apparatus, **14**, 185.
- non-metallic impurities of refined copper, **17**, 164.
- products of the oxidation of cumol by nitric acid, III, 441.
- report on recent patents connected with the reduction of iron and the manufacture of steel, **10**, 125.
- researches on gun-cotton :
1. Manufacture and composition of gun-cotton, **20**, 310.
 2. Stability of gun-cotton, **20**, 505.
- Abel, F. A., and C. L. Bloxam, contributions to the history of nitric acid, with especial reference to the valuation of nitre, **9**, 97.
- — valuation of nitre, **10**, 107.
- Abel, F. A., and F. Field, results of the analysis of commercial coppers, **14**, 290.
- Abel, F. A., and E. C. Nicholson, researches on strychnine, **2**, 241.
- Abel, F. A., and T. H. Rowney, analysis of the water of artesian wells, Trafalgar square, **1**, 97.
- Abel, F. A., and T. H. Rowney, mineral waters of Cheltenham, **1**, 193.
- Abel, J. S., obituary notice of, **25**, 342.
- Abel, J. S., and R. I. Morley, action of iodide of ethyl on toluidine, **7**, 68.
- Abel, J. S., and H. R. Richmond, bichromate of ammonium and some of its double salts, **3**, 199.
- Abeljan, derivatives of dichlorinated ether, **25**, 606.
- d'Achiardi, A., minerals from Elba, **25**, 291.
- Adger, J. B., analysis of compact tale from North Carolina, **25**, 681.
- Adie, R., description of an hermetically sealed barometer, **13**, 7.
- experiments on galvanic couples immersed in pure water and in oxygenated water, III, 380; **1**, 12.
- experiments with voltaic couples, **2**, 97.
- hydro-electric currents generated by couples formed of a single metal, **8**, 295.
- ice formed under the surface of the water in rivers, called "ground-ice," **14**, 111; **15**, 88.
- thermo-electric currents generated in elements where bismuth is used to form the joints, **8**, 33.
- thermo-electric joints formed with the metals antimony, bismuth, and palladium, **8**, 36.
- thermo-electric properties of the metals bismuth and antimony when used as single elements, **10**, 77.
- thermo-electric properties of the metals zinc and silver, **7**, 309.
- Ador, E., and V. Meyer, constitution of twice-substituted benzenes, **24**, 825.
- — sulphanilic acid, **24**, 377.
- — transformation of bromobenzoic into isophthalic acid, **24**, 367.
- Ador, E., and A. Oppenheim, sulphobenzoic acid, **24**, 131.
- Aeby, C., well-water of towns, **25**, 485.
- de Aguiar, A., nitronaphthalenes, **25**, 699.

- de Aguiar, A., and A. G. Bayer, naphthazarin, **24**, 356, 698.
- new solvent for indigotin, **24**, 268.
- Albrecht, Max., methylmercaptan-trisulphonic acid, methylmercaptan-disulphonic acid, and methyl-alcohol-trisulphonic acid, **25**, 403.
- A. H., metastannic acid and the detection and estimation of tin, **25**, 274.
- solubility of gold, and stability of auric nitrate and sulphate, **25**, 285.
- use of potassium ferrocyanide as a test for cobalt, nickel, and manganese, **24**, 757.
- Allan, James, obituary notice of, **20**, 386.
- Alsberg, M., manufacture of vermilion, **24**, 170.
- Alvergriat, luminous tubes with exterior electrodes, **24**, 1141.
- Amagat, E. H., compressibility and dilatation of gases, **24**, 874.
- expansion of moist gases, **25**, 666.
- variations in the expansion-coefficient of gases, **24**, 475.
- Amato, D., action of potassium cyanide on dichloroacetic acid, **25**, 401.
- glucosophosphoric acid, **24**, 924.
- synthesis of condensed hydrocarbons, **25**, 681.
- Amato, D., and Campisi. See Campisi.
- Ammann, H., action of nascent hydrogen on bitter almond oil, **24**, 384.
- Anderson, A. G., action of oxalic acid upon the alkaline chlorides, **1**, 231.
- A., remarks on the use of alkaline carbonates for the prevention of incrustation in steam boilers, **3**, 13.
- Anderson, A., and M. Scanlan, experiments on gases generated in a sewer, **3**, 13.
- Anderson, T., chemistry of opium, **15**, 446.
- composition of farm-yard manure, **25**, 522.
- some constituents of opium, **9**, 273.
- constitution of anthracene or parannaphthalin, and on some of the products of its decomposition, **15**, 44.
- constitution of codeine, and its products of decomposition, **4**, 112.
- constitution of the phosphates of the organic alkalis, **1**, 55.
- papaverine, **8**, 282.
- products of the destructive distillation of animal substances, **5**, 50; **22**, 406.
- researches on some of the crystalline constituents of opium, **5**, 257.
- Anderson, T., the sources of potash-salts and their use as manures, **25**, 523.
- Andrews, T., action of heat on bromine, **24**, 993.
- continuity of the gaseous and liquid states of matter, **23**, 74.
- dichroism of the vapour of iodine, **24**, 993.
- composition and properties of ozone, **9**, 168.
- latent heat of vapours, **1**, 27.
- method of obtaining a perfect vacuum in the receiver of an air-pump, **5**, 189.
- Andrews, T., and P. G. Tait, volumetric relations of ozone, and action of the electric discharge on oxide and other gases, **13**, 344.
- Angerstein, E., reduction of dibromamidobenzoic acid, **24**, 368.
- Angström, A. J., spectra of simple gases, **24**, 991.
- Ansell, G. F., qualitative separation of arsenic, tin, and antimony, **5**, 210.
- Apjohn, R., occurrence and detection of vanadium in trap-rocks, **25**, 1116.
- de l'Arbre, W. F., compounds of alkaloids with bile-acids, **25**, 829.
- Armstrong, H. E., action of nitric acid on the dichlorophenolsulphonic acids, **24**, 1112.
- action of sulphuric acid on natural alkaloids, **24**, 56.
- formation of sulpho-acids, **24**, 173.
- bromodiphenolsulphonic acid, **25**, 165.
- nitration-products of the dichlorophenolsulphonic acids, **25**, 93.
- observations on the nitrochlorophenols, **25**, 12.
- Armstrong, H. E., and F. D. Brown, formation of substituted nitrophenolsulphonic acids, **25**, 869.
- nitration-products of the dibromophenolsulphonic acids, **25**, 857.
- Armstrong and Frankland. See Frankland.
- Armstrong's hydroelectric machine, use of for exploding gunpowder, **14**, 176.
- Arnold, E., obituary notice of, **25**, 342.
- Arppe, C., anilides of pyrotartaric acid, **8**, 172.
- anilides of tartaric acid, **8**, 179.
- nitraniline and paranitraniline, **8**, 175.
- Arrott, A. R., some new cases of galvanic action, and the construction of a battery without the use of oxidizable metals, **1**, 142.

Arrott, A. R., double sulphates containing soda and a magnesian oxide, **11**, 49.
 Arzruni, A., sulpho-ureas, **24**, 570.
 Ascher, M., dioxybenzoic acid, **24**, 827.
 — tri-substitution derivatives of benzene, **25**, 239.
 Ascher, M., and V. Meyer, benzene-sulphonic acid, **24**, 554.
 Ashley, J. M., analysis of Thames water, **2**, 74.
 Athenstadt, J., behaviour of dialysed oxide of iron, **25**, 270.
 Atkinson, E., and A. Gössmann, lophine, **9**, 220.
 Atterberg, A., and P. Cleves, bromomolybdous compounds, **25**, 1080.
 Attfield, J., note on oxamide, **16**, 94.
 Aubert, A., amount of caffeine in coffee, and its physiological action, **25**, 897.
 Auerbach, G., artificial alizarin, **25**, 622.

B.

Babo and Hirschbrunn, sinapine, **6**, 187.
 Baehr-Predari and Petersen. See Petersen.
 Baerle, use of neutral water-glass for wool-washing, **24**, 860.
 Baeyer, A., compounds of aldehydes with phenols, **25**, 301, 493.
 — dehydration and its importance to vegetable life and fermentation, **24**, 331.
 — gallein, **24**, 699.
 — mellitic acid, **24**, 372.
 — new class of colouring matters, **24**, 833.
 — phenol colours, **24**, 910.
 Baker, W., occurrence of nickel in lead, and its concentration by Pattinson's process, **17**, 377.
 Baker, W., and Graham Stuart, existence of nitrogen in steel, **17**, 390.
 Ballo, M., hydrate of carbon bisulphide, **24**, 196, 488.
 — leucoline oil, and the pure naphthalene of commerce, **25**, 306.
 — sounds of vibrating flames, **25**, 219.
 Balmain, W. H., aethogen and aethonides, **1**, 149, 44 (p), 49 (p).
 — probable existence of nitrogen combined with silicon in soils and other substances, **1**, 49 (p); **11**, 15.

Baltzer, A., adamellogranite and the mica contained in it, **25**, 602.
 — blegiolite, **25**, 602.
 Baly, G., action of baryta on salicylic ether, **2**, 28.
 Bannow, A., isomeric potassium cyanate, **24**, 391.
 — preparation of guanidine, **24**, 263.
 Bannow, A., and G. Krämer, red coloration sometimes observed in white lead, **25**, 881.
 Barbaglia, G. A., benzylsulphonic acid, **25**, 490, 1017.
 Barbaglia and Ossikovsky. See Ossikovsky.
 Barbier, Ph., production of cymene from hydrate of turpentine-oil, **25**, 240.
 Barekhausen, H., amount of combined water in ferrous sulphate precipitated by alcohol, **25**, 225.
 Bardy, C., colouring matters derived from diphenylamine, **25**, 1046.
 — methylidiphenylamine, **24**, 1197.
 Bardy and Berthelot. See Berthelot.
 Bardy and Dusart. See Dusart.
 Barker, G. F., spectrum of the Aurora Borealis, **25**, 119.
 Barratt, J., analysis of the water of Holywell, North Wales, **12**, 52.
 — carbonates of alumina, ferric oxide, and chromic oxide, **13**, 90.
 Barringer and Fittig. See Fittig.
 Barth, L., action of potash on benzoic acid, **25**, 1013.
 — preparation of protocatechuic acid from oxybenzoic acid, and constitution of the former body, **24**, 829.
 — transformation of phenol, **24**, 122.
 — tyrosine, **25**, 896.
 Barth, L., and C. Senhofer, derivatives of dioxybenzoic acid, **25**, 1014.
 — — disulphobenzoic acid, and a new dioxybenzoic acid, **24**, 828.
 Basaroff, A., direct conversion of ammonium carbonate into urea, **21**, 194.
 Bassett, H., cyanogen derivative of marsh-gas, **19**, 352.
 — eulyte and dyslyte, **25**, 98.
 — Julin's chloride of carbon, **20**, 443.
 — note on the action of chloropierin and chloroform on acetate of potash, **18**, 31.
 — tetrabasic carbonate or ortho-carbonate of ethyl, **17**, 198.
 Battershall, J., aldehyde of the naphthalene group, **24**, 1057.
 — naphthalene derivatives, **25**, 698.

- Baudrimont, A., intimate action of substances which assist the decomposition of potassium chlorate, **24**, 1151.
 — mineral matter of plants, **25**, 642.
 Baudrimont's protosulphide of carbon, **13**, 248.
 Bauer, A., alloy of lead and platinum, **24**, 202.
 Bauer, M., crystalline form of scheelite, **25**, 227.
 Baumann, E., vinyl-compounds, **25**, 890.
 Baumert, M., new oxide of hydrogen, and its relation to ozone, **6**, 169.
 Baumhauer, E. H., meteorite from Tjribe (India), **25**, 603.
 Baumhauer, H., action of hydrogen bromide on nitronaphthalene, **25**, 136.
 — constitution of rosaniline, **24**, 835.
 — solidifying point of bromine, **25**, 220.
 Baur, R., attar of roses, **25**, 937.
 Bayer, A. G., homologue of cyanethine, **24**, 397.
 Bayer, K. J., indium, **24**, 664.
 — reactions of manganous chloride, **25**, 1078.
 Bayer and de Aguiar. See de Aguiar.
 Bealey, A., examination of an ore of cinnabar from New Almaden, California, **4**, 180.
 Beaufoy, H., obituary notice of, **5**, 159.
 Béchamp, A., carbonic and alcoholic fermentation of sodium acetate and ammonium oxalate, **24**, 511.
 — cause of alcoholic fermentation by beer-yeast, and formation of leucine and tyrosine in that fermentation, **25**, 260.
 — new method of incinerating animal and vegetable substances; its application to the estimation of the mineral constituents of yeast, **24**, 855.
 — origin and nature of ferments, **25**, 259.
 — development of alcoholic and other ferments in fermentable mixtures without the direct intervention of albuminoid substances, **25**, 260.
 Becherhinn, C., monacetorosaniline, **24**, 1062.
 Beclii, E., beryl from Elba, **25**, 795.
 — tourmaline from the island Giglio, **25**, 795.
 Becquerel, E., remarks on Leblanc's observations on the two-liquid battery, &c., **25**, 664.
 Becquerel, E., and E. Frémy, electro-chemical researches on the properties of electrified bodies, **5**, 272.
 Becquerel, M., action of electricity on the coloured tissues of plants, **24**, 796.
 — chemical effects produced by the heat of an electric discharge, **25**, 211.
 — decoloration of flowers by electricity, **25**, 262.
 — decoloration of flowers and leaves by electric discharges, **24**, 796, 883.
 — effects of slow actions prolonged for a number of years, **25**, 873.
 — influence of pressure on endosmose and exosmose, **25**, 974.
 — transport of salts by the electric discharge, **24**, 882.
 Beetz, W., measurement of the internal resistance of voltaic batteries by the compensation method, **24**, 649.
 — spontaneous change of fats, **1**, 230.
 Behr, A., derivatives of tetraphenyl-ethylene, **25**, 472.
 — tetraphenyl-ethylene, **24**, 119.
 Beilstein, F., detection of chlorine, bromine, and iodine in organic substances, **25**, 1039.
 Beilstein, F., and A. Kuhlberg, cin-
 namic acid, **25**, 300.
 — isomeric tolylenediamines, **24**, 565.
 — isomerism in the benzene series, **24**, 680.
 — isomerism in the benzoic series, **25**, 708.
 — metanitrocinnamic and meta-
 nitrobenzoic acids, **25**, 710.
 — mono- and di-nitronaphtha-
 lene, **24**, 695.
 — a new nitro-ortho-toluidine, **24**, 563.
 le Bel, J., hydrocarbons from Pechel-
 bronn petroleum, **25**, 886.
 Bell, C. A., composition of the ferric
 iodates, **24**, 108.
 Bell, I. L., chemical phenomena of iron
 smelting, **24**, 446.
 — chemistry of the blast-furnace, **22**,
 203.
 Bell, Jacob, obituary notice of, **13**, 167.
 Bell, James, fungi and fermentation,
23, 387.
 Bell, J. C., solubility and crystallisation
 of plumbic chloride in water, and in
 water containing various percentages
 of hydrochloric acid of sp. gr. 1.162,
21, 350.
 Bellucci, C., formation of ozone by
 plants, **25**, 515.
 Bender, C., acetone-sulphonic acid, **24**,
 702.
 — cements, 1097.
 — hydrate of magnesium oxychloride,
24, 1168.

- Bennett, E. T., analysis of the Thames water at Greenwich, **2**, 195.
- Benrath, H., baryta-glasses, **25**, 336.
- chemistry of the devitrification of glass, **25**, 387.
- Bérard, E. P., note on "le salant," **25**, 86.
- Berger, C. H., obituary notice of, **22**, iv.
- Bergstrand, C. E., manuring with straw, **25**, 1112.
- Berlé, F., stibamyls, **9**, 282.
- Bernard, Cl., action of carbonic oxide on blood-globules, **24**, 839.
- animal glycogenesis. Evolution of glycogen in the bird's egg, **25**, 837.
- Bert, P., influence of changes in barometric pressure on the phenomena of life, **25**, 831, 1029.
- influence of various colours on vegetation, **25**, 261.
- Bertagnini, C., compounds of several essential oils with the alkaline bisulphites, **5**, 317.
- formation of amarine, furfurine, and anisine, **7**, 95.
- phillyrin, **8**, 187.
- Bertagnini and Cannizzaro, anisic alcohol, **9**, 190.
- Berthelot, M., formation of alcohol from olefiant gas, **8**, 148.
- new test for alcohol, **24**, 1093.
- contributions to the history of carbon, **24**, 1023.
- camphic acid, **25**, 821.
- carbon oxysulphide **25**, 995.
- cellulose and tunicin, **25**, 1000.
- force of detonating gaseous mixtures, **24**, 300.
- formation and preparation of formic acid, **9**, 182.
- compounds of glycerin with acids, **7**, 282.
- compounds of glycerin with acids, and synthesis of the proximate principles of animal fats, **6**, 280.
- heat evolved in the formation of organic derivatives of nitric acid, **24**, 872.
- heat of formation of the oxygen-compounds of nitrogen, **25**, 593.
- natural nitrification, **24**, 1000.
- effect of non-luminous discharge, **25**, 663.
- action of phenol on ammonia, **24**, 123.
- changes of pressure and volume produced in chemical combination, **24**, 975.
- constitution of acid salts in solution, **25**, 875.
- state of substances in solution, **25**, 212.
- Berthelot, M., synthesis of organic acids, **25**, 142.
- synthesis of organic substances, **17**, 37.
- thermal effects of the combination of alcohols with bases, **24**, 975.
- thermic researches on sulphur, **25**, 980.
- thermo-chemical researches on the ammonia salts, **24**, 1129; **25**, 19, 21.
- thermo-chemical researches on the cyanogen series, **24**, 982.
- thermo-chemical researches on the formation of precipitates, **25**, 107.
- Berthelot and Bardy, conversion of ethylenenaphthalene into acenaphthene, **25**, 700.
- Berthelot and Jungfleisch, the chlorides of acetylene and the synthesis of Julius's chloride, **25**, 996.
- — laws which regulate the distribution of a substance between two solvents, **25**, 783.
- Berthelot and Longuinine, thermo-chemical researches on compounds formed by double decomposition, **25**, 973.
- Berthelot and de Luca, action of hydriodic acid upon glycerin, **8**, 192.
- — action of iodide of phosphorus upon glycerin, **8**, 145.
- Bessemer's process for the manufacture of steel, **10**, 142, 151.
- Beyer, A., constituents of yellow lupine seed, **25**, 519.
- influence of river and spring water on meadow grass, **25**, 518.
- Bialoblocki, J., influence of the temperature of the soil on the development of certain plants, **25**, 167.
- Biederman, R., relation between absorption, weathering, and fertility of soils, **25**, 643.
- phenylene-diacetic acid, **25**, 1013.
- Biedermann and Oppenheim, terpene dibromide, **25**, 1009.
- Biedermann and Sell. See Sell.
- Biltz, E., uselessness of ammonio-ferrous sulphate for the estimation of chlorine, **24**, 753.
- further observations on the estimation of chlorine by ammonio-ferrous sulphate, **25**, 523.
- Binz, C., influence of alcohol on the temperature of healthy men, **25**, 310.
- quinine, **25**, 1100.
- Birker, H., and R. Ulbricht, influence of saline solutions and other agents on the weathering and decomposition of felspar, **25**, 386.

- Birnbaum, K., action of sulphurous acid on platonic chloride, **24**, 891.
- Bischof, C., analytic and pyrometric examination of graphite, **25**, 919.
- comparative pyrometric valuation of kaolins, **24**, 450.
- fireclays, **24**, 960.
- improvement of refractory clays, **24**, 868.
- manufacture of dinas-stone (quartz-bricks), **24**, 1099.
- pyrometric examination of a clay from Eisenberg, **25**, 186.
- Bischof, G., determination of the quality of potable waters, **25**, 334.
- Bischoff, C., contribution to the history of chloral, **25**, 107.
- action of chlorine and bromine on an alcoholic solution of hydrocyanic acid, **25**, 411.
- action of chlorine on hydrocyanic acid in alcoholic solution, **24**, 136.
- Bischoff, C., and A. Pinner, chloral cyanhydrate and trichloroacetic acid, **25**, 108.
- trichloroacetic and trichloroangelic acids, **25**, 485.
- Bizio, G., mineral waters of the Euganean Hills, Padua, **24**, 1022.
- Blaserna, P., indices of refraction of anisic and methyl-salicylic alcohols, **25**, 1096.
- shifting of the spectrum lines by the action of temperature on the prisms, **25**, 118.
- Bleekrode, L., curious property of gun-cotton, **24**, 171.
- Bleibtreu (Hermann), cumarin, III, 205.
- Bljeducho, J., preparation of methylene iodide, **24**, 1027.
- Blochmann, R., the calcium spectrum, **24**, 1149.
- Blomstrand, C. W., conjugated compounds of pentatomic nitrogen, **24**, 483.
- metallammonias or metallamines, **24**, 189.
- Blondlot, M., alcoholic fermentation of milk-sugar, **25**, 316.
- Blossom, T. W., assay of gold and silver, **25**, 182.
- Bloxam, C. L., source of the arsenic in the sulphuric acid of commerce, and the preparation of the acid free from arsenic, **15**, 52.
- on the capacity of arsenious acid for bases, and on certain arsenites, **15**, 281.
- crystallised hydrates of baryta and strontia, **13**, 48.
- action of boracic acid upon the carbonates of the alkalis and alkaline earths, **12**, 177.
- Bloxam, C. L., action of chlorine on arsenious acid, **18**, 62.
- application of electrolysis to the detection of poisonous metals in mixtures containing organic matters, **13**, 12.
- electrolytic test for arsenic, and the presence of that metal in certain reagents, **13**, 338.
- action of hydrosulphate of ammonium on freshly precipitated sulphide of copper, **18**, 94.
- juice of beef, **10**, 153.
- qualitative analysis of substances insoluble in water and in acids, **18**, 226.
- notes on the general routine of qualitative analysis for metals, **18**, 97.
- detection and qualitative separation of tin, antimony, and arsenic, and the relation existing between these metals and others which are precipitated from their acid solutions by sulphuretted hydrogen, **5**, 104.
- amount of water displaced from the hydrates of potash, soda, and baryta by boracic and silicic acids, **14**, 143.
- Bloxam and Abel. See Abel.
- Bloxam, T., clean and unclean surfaces in voltaic action, **24**, 990.
- Blumer's new aniline blue for printing, **25**, 186.
- Blunt, T. P., estimation of nitric acid in potable waters, **25**, 922.
- phosphide of magnesium, **18**, 106.
- Blyth, J., composition and origin of condurrite, **1**, 213.
- composition of narcotine and some of its products of decomposition by the action of bichloride of platinum, II, 163.
- styrol, and some of the products of its decomposition, II, 334.
- obituary notice of, **25**, 343.
- Bobbier, A., chemical studies on the moors (Landes) of Brittany, **25**, 320.
- Bode, F., decomposition of nitrous sulphuric acid by means of Glover's towers, **25**, 335.
- Bodenbender, illuminating gas from Bohemian lignite, **25**, 1138.
- Boettger and Petersen, artificial alizarin, **24**, 1195.
- nitrogen compounds of anthraquinone, **24**, 531.
- Bohlig, E., analysis of chrome greens, **24**, 412.
- volumetric method for determining sulphuric acid, baryta, chlorine, bromine, and iodine, **24**, 436.

- Bohn, C., apparatus for the convenient arrangement of certain combinations of galvanic elements, **24**, 884.
- on the ice calorimeter, **24**, 643.
- Boillot, A., method of purifying fats, **24**, 459.
- preparation of ozone, **25**, 879.
- Boivin and Loiseau, "suerate of hydrocarbonate" of lime applied to the purification of sugar-cane juice, **24**, 170.
- Bolas, T., distillation and boiling point of glycerin, **24**, 84.
- Bolas, T., and E. Francis, products of the action of nitric acid on the resinous extract of Indian hemp, **22**, 117.
- Bolas, T., and C. E. Groves, note on bromopicroin, **23**, 153.
- — tetrabromide of carbon, **23**, 154, 161; **24**, 773.
- Bolle, C., wool washing and dyeing, **24**, 1223.
- Bolley, P., formation of aromatic nitro-compounds in alcoholic solution, **24**, 222.
- colouring matters of Persian berries, and certain general relations of yellow vegetable dyes, **13**, 327.
- crystalline form of metallic chromium, **13**, 333.
- discrepancies in the statements of Pelouze and Mohr respecting the solubility of gallo-tannic acid in ether, **13**, 325.
- a hitherto unobserved source of paraffin, **13**, 329.
- physical properties of the alloys of tin and lead, **15**, 30.
- experiments on the dangers arising from the use of certain waters for feeding steam-boilers, **15**, 32.
- Borgmann and Græbe. See Græbe.
- Bosscha, J., apparent expansion of mercury, **24**, 483.
- Böttger, R., new and very delicate test for ammonia, **25**, 263.
- Böttger's disinfecting dressing for stinking wounds, **24**, 769.
- Bouchardat, G., transformation of acetone into hydride of hexylene (di-propyl), **25**, 409.
- acetic ethers of dulcite, **25**, 400.
- hexenzodulcite and tetrabenzodulcitan, **25**, 1093.
- artificial production of dulcite, **24**, 810.
- compounds of dulcite with hydracids, **25**, 399.
- transformation of glucose into monatomic and hexatomic alcohols, **25**, 66.
- Bouchardat, G., organic base from sugars, **25**, 691.
- presence of milk-sugar in a vegetable juice, **24**, 915.
- Bouchet and Bourgoin. See Bourgoin.
- Bouis, J., caprylic alcohol and its derivatives, **7**, 286.
- detection of hydrochloric acid in cases of poisoning, **25**, 87.
- composition of ricinolamide and production of caprylic alcohol, **4**, 362.
- Bourgoin, E., the complex nature of cathartin, **25**, 152.
- electrolysis of neutral potassium acetate, **24**, 917.
- action of hydrogen on nitric acid, **24**, 885.
- detection of nitrobenzene in bitter almond oil, **25**, 843.
- estimation of nitrobenzene in bitter almond oil, **25**, 1127.
- Bourgoin and Bouchat, purgative principles of Alexandrian senna, **24**, 1068.
- Boussingault, J., determination of the combined carbon in meteoric iron, **25**, 604.
- fermentation of fruits, **25**, 906.
- iron in the blood of an invertebrate animal, **25**, 899.
- iron in the blood and food, **25**, 832.
- appearance of sweet and skim milk under the microscope, **25**, 1106.
- extraction of oxygen gas from atmospheric air, **5**, 269.
- saccharine matter found in the leaves of a lime-tree, **25**, 316.
- dry process for the estimation of silicon in cast and wrought iron, **24**, 1212.
- sorbite, a saccharine matter analogous to mannite, found in the juice of mountain-ash berries, **25**, 480.
- freezing of water, **24**, 795; **25**, 976.
- Boutigny, C., cremic and apocremic acids in mineral waters, **24**, 921.
- Bowman, H., supposed native copper, **24**, 115.
- tribasic boracic ether, III, 248.
- Bowman, J. E., obituary notice of, **9**, 159.
- Brady, H. B., and H. Deane, microscopical research in relation to pharmacy, **18**, 34.
- Brande, J. W., analysis of the water of the Mint, **2**, 345.
- W. T., obituary notice of, **19**, 509.
- Brandt, anthraflavic acid, **25**, 1139.
- Branly, E., measurement of polarisation in a voltaic element, **25**, 381.

- Braun, R., and P. Greiff, new decomposition-product from commercial aniline, **25**, 502, 1100.
- Braunschweiger, J. R., action of moist ultramarine on silver, **24**, 970.
- red, green, and blue fire, **24**, 970.
- Brayley, E. W., obituary notice of, **23**, 292.
- Brazier, J. S., and G. Gossleth, caproic and oenanthylic acids, **3**, 210.
- Brazier, J. S., and J. E. Mayer, analysis of the mineral constituents of the flax-plant and of soils on which the plants had been grown, **2**, 78.
- — analysis of plate glass, **2**, 208.
- Brescius, E., ferric hydrate, **24**, 497.
- Bretschneider, P., absorption of ammonia from the air by humus, **25**, 917.
- Brezina, crystalline form of lead dithionate, and the law of the trigonal pyramids in circular-polarising substances, **24**, 1180.
- Brockbank, W., effects of cold upon the strength of iron, **24**, 167.
- Brodie, B. C., calculus of chemical operations; being a method for the investigation, by means of symbols, of the laws of the distribution of weight in chemical change, Part I. On the construction of chemical symbols, **21**, 367.
- condition of certain elements at the moment of chemical change, **4**, 194.
- observations on the constitution of the alcohol-radicals and on the formation of ethyl, **3**, 405.
- combination of carbonic oxide with potassium, **12**, 269.
- the atomic weight of graphite, **12**, 261.
- action of iodine on phosphorus, **5**, 289.
- further experiments as to the reduction of metallic oxides by peroxide of barium, **7**, 304.
- peroxides of the radicals of the organic acids, **17**, 264.
- organic peroxides theoretically considered, **17**, 281.
- oxidation and deoxidation produced by the alkaline peroxides, **16**, 316.
- Brønner and Gutzkow, preparation of anthracene from coal-tar pitch, and of dye-stuffs from anthracene, **24**, 1222.
- Broughton, J., new reaction for the production of anhydrides and ethers, **18**, 21.
- Brown, A. Crum, theory of isomeric compounds, **18**, 230.
- E. O., new volumetric method for the determination of copper, **10**, 65.
- Brown, H. T., electrolysis of sugar-solutions, **25**, 578.
- influence of pressure on fermentation, **25**, 570.
- Brown, J., salts and decomposition-products of pyromeconic acid, **6**, 78.
- J. T., tables for the calculation of vapour-densities, **19**, 72.
- table for the calculation of direct nitrogen determinations, **18**, 210.
- vapour-densities, **23**, 323.
- Brown and Armstrong. See Armstrong.
- Bruce, J. A., preparation of carbonate of amyl, **5**, 131.
- Brücke's processes for the detection of sugar in urine, **14**, 32, 36.
- Brücke, E., new method of preparing glycogen, **25**, 83.
- experiments with the so-called peptones, **24**, 410.
- Brücke, J. W., derivatives of piperidine, **24**, 1063.
- Brunner, A., combination of the Bessemer and Martin processes, **24**, 604.
- Brunner, L., precipitation of phosphoric acid, **25**, 922.
- estimation of sugar by Fehling's solution, **25**, 928.
- Brunner and Wislicenus. See Wislicenus.
- Brush, G. J., galinite, **24**, 115.
- the Franklin meteorite, **24**, 329.
- ralstonite, **24**, 1019.
- Buchanan, J. Y., formation and decomposition of chlorinated acids, **24**, 551.
- lecture apparatus for specific gravities, **24**, 482.
- Buchner, A., easy method of purifying sulphuric acid from arsenic, **8**, 258.
- Buchner, L. A., examination of bread and flour for alum, **25**, 1043.
- formation of transparent cubes of sodium chloride, **24**, 311.
- Buchner, Max., yellow and red arsenic pigments, **25**, 268.
- Buckton, G. B., products of the oxidation of Chinese wax, **10**, 166.
- new series of double chlorides containing diplatosammonium, **5**, 213.
- department of diplatosamine with cyanogen, **4**, 26.
- platino-tersulphocyanides and platino-bisulphocyanides, two new series

of salts, and their decompositions, **7**, 22.

Buckton, G. B., formation of organo-metallic radicals by substitution, **16**, 17.

— stibethyls and stibmethyls, **13**, 115.

Buckton, G. B., and A. W. Hofmann, action of sulphuric acid on the amides and nitriles, together with remarks on the conjugate sulpho-acids, **9**, 241.

Budde, H., action of light on chlorine and bromine, **23**, 28.

Buff, H., heat of expansion of solids, **25**, 780.

— law of electrolysis, **6**, 47.

Buff, H., and F. Wöhler, compounds of silicon, **11**, 90.

Buff, H. L., amidosulphotoluylenic acids, **24**, 253.

— atomic volume of allyl alcohol, **24**, 905.

— cresols of coal-tar, **24**, 531.

Bukeisen, F., and J. A. Wanklyn, action of sodium on iodide of methyl mixed with ether, **13**, 140.

Bulk, C., the sulpho-acids of aniline blue, **25**, 717.

Bullock, C., litmus-paper as a reagent, **25**, 321.

Bunge, G., physiological action of beef-tea and potash-salts, **25**, 314.

Bunge, N., electrolysis of chemical compounds, **24**, 186.

Bunsen, R., new class of eacodyl compounds containing platinum, **1**, 63.

— radical of the eacodyl series of compounds, **1**, 49.

— calorimetric researches, **24**, 180.

— ice calorimeter, **24**, 643.

— researches on chemical affinity, **6**, 82.

— direct formation of cyanogen from the union of the nitrogen of the air with carbon, **11**, 391.

— instrument for graduating glass tubes, **11**, 54.

— constitution of iodide of nitrogen, **6**, 90.

— preparation of lithium, **8**, 143.

— method of volumetric analysis of very general application, **8**, 219.

Bunsen, R., and G. Kirchhoff, chemical analysis by spectrum observations, **13**, 270.

Bunsen, R., and H. E. Roscoe, photo-chemical researches, **8**, 193.

Burden, F., boiling points of organic bodies, **24**, 483.

Burgemeister, A., application of glycerin to mercerise and mordant vegetable fibre, **25**, 187.

Burnard, C. F., modification of the ap-

paratus for estimating the carbonic acid in carbonated alkalis, &c., **11**, 199.

Busse and Henneberg. See Henneberg.

Busteed, H. E., silver assay in the Indian mints, **25**, 182.

Butlerow, A., chemical structure of some non-saturated hydrocarbons, **24**, 214.

— oxidation of tertiary alcohols, **25**, 295.

— properties of trimethylearbinol, **24**, 1035.

Butlerow and Gerainow, action of mercuric cyanide and of zinc-ethyl on butyl iodide, **25**, 1092.

Byasson, H., chloral sulphhydrate, **25**, 612.

— petroleum, **24**, 1021.

— physiological action of chloral hydrate, **24**, 748.

— physiological action of formic ether, **25**, 638.

C.

Cahours, A., anisol and phenetol, **3**, 74.

— composition of mesitol, **3**, 17.

— piperidine, a new alkali derived from piperine, **6**, 175.

— researches on pelargonic acid, **3**, 240.

— volatile oils obtained in the distillation of wood, **3**, 183.

Cahours, A., and S. Cloez, action of chloride of cyanogen on the ammonia-bases, **7**, 184.

Cahours, A., and A. W. Hofmann, new class of alcohols, **10**, 316.

— researches on the phosphorus-bases, **11**, 56.

Cailletet, L., the origin of the carbon fixed by plants, **25**, 158.

— compressibility of liquids under high pressure, **25**, 974.

— influence of pressure on the lines of the spectrum, **25**, 664.

Cairns, F. A., Elliott's method of estimating carbon in bone-charcoal, graphite, anthracite, &c., **25**, 1120.

Calvert, F. C., examination of bleaching powder, **25**, 843.

— dyes and dye-stuffs other than aniline, **25**, 1144.

— composition of a carbonaceous substance existing in grey cast iron, **14**, 199.

— preparation of certain chlorates, and particularly of chlorate of potash, **3**, 106.

- Calvert, F. C., new method for the analysis of chrome ores, **5**, 194.
- crystallised hydrate of phenylic alcohol, **18**, 66.
- comparative influence of various substances in preventing the decomposition of organic bodies, **24**, 1079.
- experiments on oxidation by means of charcoal, **20**, 293.
- oxidation of iron, **24**, 198.
- preparation and composition of the oxides of lead, and their combinations with nitric acid and ammonia, **11**, 205.
- presence of soluble phosphates in cotton-fibres, seeds, &c., **20**, 303.
- action of silicate and carbonate of soda on cotton fibre, **18**, 70.
- estimation of sulphur in coal and coke, **24**, 1089.
- Calvert, F. C., and E. Davies, new method of preparing hypochloric acid, or peroxide of chlorine, **11**, 193.
- Calvert, F. C., and R. Johnson, action of acids on metals and alloys, **19**, 434.
- action of sulphuric acid on lead, **16**, 66.
- Camboulises, contributions to the chemical history of the Roman chamomile, **25**, 171.
- Campani, G., detection of iodine in the form of metallic iodides, **24**, 1084.
- manganese in the blood, **24**, 1074.
- spectroscopic characters of the ammoniacal solutions of carmine, cochineal, and other substances, **24**, 1096.
- production of urea by decomposition of aqueous hydrocyanic acid, **24**, 1067.
- Campbell, C., preparation of vegetable parchment, **24**, 861.
- Campbell, D., application of sewage to agriculture, **16**, 272.
- source of the water in the deep wells in the chalk under London, **9**, 21.
- Campbell, Graham and Stenhouse. See Graham.
- Campbell, J., and A. Heynsius. See Heynsius.
- Campbell, R. C., ferrocyanides, **1**, 38.
- Campenhausen, E., water culture experiments with flax, **24**, 1209.
- Campisi, G., and D. Amato, action of urea nitrate on benzylic alcohol, **24**, 928.
- Cannizzaro, S., alcohol corresponding to benzoic acid, **7**, 192.
- anisic alcohol and methyl-salicylic alcohol, **25**, 1095.
- benzoic (benzylic) alcohol, **8**, 169.
- action of cyanogen chloride on benzylic alcohol, **24**, 926.
- monobenzyl-urea, **24**, 928.
- Cannizzaro, S., considerations on some points in the theoretic teaching of chemistry, **25**, 941.
- Cannizzaro and Bertagnini. See Bertagnini.
- Carius, L., decomposition of nitric acid by heat, **25**, 35.
- absorption of ozone by water, **25**, 785.
- phenaconic and fumaric acids, **25**, 144.
- Carles, P., estimation of cream of tartar in wine, **24**, 1211.
- new quinimetric process, **25**, 1128.
- inconveniences presented by the substitution of soda for potash, **25**, 266.
- vanillic acid, **25**, 708.
- Caro and Graebe. See Graebe.
- Caron, H., iron, crystalline, or burnt, **25**, 466.
- Carstanjen, E., acetylene and allylene, **25**, 231.
- derivatives of thymol, **24**, 350.
- Carstanjen and Aarland. See Aarland.
- Carstanjen and Schertel, attempts to prepare carbonyl cyanide, **24**, 900.
- action of ethylene iodide on acetylde of copper, **24**, 903.
- syntheses by means of nascent formic acid, **24**, 897.
- oxidation of α -naphthyl-carboxylic acid, **24**, 920.
- Carty, J., new cyanide of gold, **11**, 80.
- on a specimen of diseased wheat, **11**, 199.
- Casamajor, P., purification of sugar-solutions for the optical saccharometer, **25**, 927.
- Caspary, W., and B. Tollens, acrylic acid and acrylic ether, **25**, 814.
- Casselmann, A., tartrate of lime, and a new reaction of tartaric acid, **8**, 306.
- Cech, O., centrifugalising of raw sugar, **24**, 458.
- results of manures applied to beet-root, **24**, 854.
- Chabot, P., junr., obituary notice of, of, **21**, xxxiv.
- Chabrier, M., new observations on the alternate predominance of nitrous and nitric acid in rain-water, **25**, 281.
- quantities of nitrous and nitric acid in rain-water, **25**, 87.
- nitrous acid in soil, **24**, 852.
- transformation of nitrous acid in soil, **25**, 319.
- nitrous acid in the water and mud of irrigation-canals, **24**, 950.
- Champion, P., dambonite, **24**, 811.
- use of dynamite for breaking up large castings, **24**, 772.

- Champion, P., dynamite, and its use in war, **24**, 771.
- compounds of erythrite, **24**, 811.
- nitroethyl, nitroglycol, and a general method of transforming alcohols into their corresponding nitric ethers, **24**, 1036.
- compounds derived from paraffin, **25**, 803.
- preparation of sericic and lanuginic acids, **24**, 380.
- Champion, P., and Leygue. See Leygue.
- Champion, P., and H. Pellet, theory of the explosion of detonating compounds, **25**, 874.
- Chance, H., manufacture of glass, **21**, 242.
- Chance, G., contraction of solutions of cane-sugar at the moment of inversion, and a new process of saccharimetry, **25**, 463.
- propionic alcohol, **6**, 287.
- Chance and Martins. See Martins.
- Chapman, E. T., production of acetic and propionic acids from amyl alcohol, **19**, 333.
- note on some reactions of alcohols, **23**, 96.
- synthesis of butylene, **20**, 28.
- caprylic and oenanthylic alcohols, **18**, 290.
- oxidation of formic acid, **20**, 289.
- new synthesis of formic acid, **20**, 133.
- reactions of hydriodic acid, **20**, 166.
- mercury-ethyl, **19**, 150.
- action of acids on naphthylamine, **19**, 329.
- the estimation of nitric acid in potable waters, **21**, 172.
- decompositions of nitrite of amyl, **19**, 336.
- action of nitrous acid on naphthylamine, **19**, 135.
- the organic matter contained in the air, **23**, 98.
- limited oxidation; determination on the oxygen consumed, **20**, 227.
- production of the sulphates of the alcohol-radicals from the nitrites by the action of sulphurous acid, **23**, 415.
- Chapman, E. T., and M. H. Smith, note on bromide of amyl, **22**, 198.
- — decompositions of the acids of the acetic series, **22**, 185.
- — butyl compounds derived from the butylic alcohol of fermentation, **22**, 153.
- — oxidation of the acids of the lactic series, **19**, 477; **20**, 296.
- Chapman, E. T., and M. H. Smith, limited oxidation with alkaline permanganate, **20**, 301.
- — nitrous and nitric ethers, their decompositions and reactions, **20**, 576.
- — propyl compounds derived from the propylic alcohol of fermentation, **22**, 193.
- — quantitative analysis by limited oxidation, **20**, 173.
- — action of zinc-ethyl on nitrous and nitric ethers, **21**, 174.
- Chapman, E. T., and W. Thorp, relation between the products of gradual oxidation and the molecular constitution of the bodies oxidised, **19**, 477.
- — relation between the products of oxidation and the molecular constitution of the bodies oxidised, **20**, 30.
- Chapman and Wanklyn. See Wanklyn.
- Chapman, Wanklyn and Smith. See Wanklyn.
- Chatard, J. M., determination of molybdic acid as plumbic molybdate, **24**, 758.
- Chatterly, M. W. F., saline manures containing nitrogen, **1**, 152.
- Chevreaul, E., ash of paper from the burning of the *Ministère des Finances*, Paris, **24**, 863.
- stability of colours fixed on stuffs, **23**, 1144.
- Chiozza, L., anhydrous organic acids, **6**, 184.
- researches on the oxygen-radicals, **6**, 182.
- Chiozza, L., and A. Frapolli, commaramine, a new organic base derived from nitrocoumarine, **8**, 301.
- Chojnaeki and Liebermann. See Liebermann.
- Christiansen, O., refraction relations of fuchsine, **24**, 884.
- Church, A. H., analyses of some bronzes found in Great Britain, **18**, 215.
- preliminary note concerning a new homologue of benzoic acid, **14**, 52.
- colouring matter of blue forest marble, **17**, 379.
- notes on a Cornish mineral of the atacamite group, **18**, 212.
- chemical researches on new and rare Cornish minerals, **18**, 259; **19**, 130; **23**, 3, 165.
- — didymium in British minerals, **23**, 1075.
- ferric hydrate from Cornwall, **18**, 214.
- experiments on the density of garnet, idocrase, &c., **17**, 386.

- Church, A. H., hydrated cupric oxy-chlorides from Cornwall, **18**, 77.
 — hydrated cupric oxysulphates from Cornwall, **18**, 83.
 — analysis of a meteorite from South Africa, **22**, 22.
 — additional experiments on the density of certain minerals, **17**, 415.
 — namaqualite, **23**, 1.
 — metamorphoses of oxalic acid, **16**, 301.
 — formation of phenic and benzoic acids from benzene, **16**, 76.
 — analysis of red chalk, **16**, 79.
 — on some processes of rock formation now in action, **16**, 30.
 — observations on silica, **15**, 107.
 — brittle silver, **24**, 498.
 — experiments on sugar-beet, **25**, 518.
 — zircons, **24**, 115.
 Church, A. H., and A. B. Northcote, action of caustic potash on the phosphates, **6**, 53.
 — — behaviour of some oxides with caustic potash in presence of oxide of chromium, **6**, 54.
 Church, A. H., and W. H. Perkin, new colouring matters, derivatives of dinitrobenzol, dinitronaphthaline, &c., **9**, 1.
 — — derivatives of naphthylamine, **16**, 207.
 Clapton, E., acid oxalates of the earths, **5**, 223.
 Clark, G. F., analysis of Thames water, **1**, 155.
 Clark, John, analysis of chrome ore, **25**, 177.
 Clark, Thomas, revision and more exact determination of atomic weights, **1**, 15 (p).
 — gas-burner for a laboratory table, **1**, 35 (p).
 — his method of ascertaining the hardness of water, **1**, 8 (p).
 — removal of lead, the chief poison to be apprehended from water, by means of an effective filter, **11**, 384.
 — obituary notice of, **21**, viii.
 Clark's soap-test, action of, on Dee water, **4**, 126.
 — soap-test, degree of hardness of the waters of the eight principal London companies determined by, **4**, 382.
 Clark, W. S., description of a self-acting wash-bottle, **9**, 200.
 Clarke, C. H., and H. Medlock, analysis of the waters from the deep wells of Westbourne Park and Russell Square, and of the artesian well of the Hanwell Lunatic Asylum, **6**, 115.
 Clarke, G. P., reactions of oils with sulphuric acid, **24**, 452.
 de Claubry, G., mode of precipitating all the metals contained in a liquid by one operation (in chemico-legal investigations), **3**, 162.
 Claudet, F., ammoniacal compounds of cobalt, **4**, 355.
 Claus, A., decomposition of acrolein-ammonia by dry distillation, **24**, 537.
 — formation of azobenzene, **25**, 693.
 — azophenylene, a new nitrogenous compound of the aromatic series, **25**, 694.
 — carbothialdine, **25**, 691.
 — dichlorhydrin, **25**, 684.
 — dichloroglycide, **25**, 635.
 — constitution of diglycollic, diglycollamic, and triglycollamic acids, **24**, 361.
 — decomposition of grape sugar by cupric oxide in alkaline solutions, **24**, 914.
 — decomposition of the so-called sulpho-ureas by nitrous acid, **24**, 267.
 — sulphazotised acids, **24**, 307, 659.
 — action of nitrous acid on urea in aqueous solution, **24**, 265.
 — action of potassium sulphocyanate on allyl iodide, **25**, 890.
 Claus and Keerl, thio-isopropyl alcohol isopropylsulphonic acid, **25**, 998.
 Claus and Krall, action of sulphur chloride on aniline in presence of carbon bisulphide, **24**, 264.
 Claus and Pfeifer, bromochlorosalicylic and bromochlorobenzoic acid, **25**, 1014.
 Clavel, L., night violet, **25**, 531.
 Clermont, A., trichloracetates, **24**, 1043; **25**, 481.
 — preparation of trichloroacetic acid, **24**, 812.
 Cloez and Cahours. See Cahours.
 Cloez and Guignet, Chinese green, **25**, 706.
 des Cloizeaux, montebasite, **24**, 892.
 Clowes, F., automatic thermo-regulator, **24**, 639.
 Cock, W. J., palladium, its extraction and alloys, **1**, 161; **1**, 46 (p).
 — production of artificial uranite, **1**, 38 (p).
 Coffin, W. H., galvanic battery elements, **25**, 120.
 Cohen, E., Permian rocks of the Lower Odenwald, **25**, 796.
 Cohn, F., Bacteria, **25**, 641.
 Colley, R., Leidenfrost's phenomenon, **24**, 974.
 Collins, J. H., analysis of the incrustated surface of a block of Jew's tin, **25**, 678.

Commaille, A., action of ammonia on phosphorus, **24**, 1159.
 Conard, T. E., neutral crystallisable principle of black snake-root, **24**, 409.
 de Coninek, P., on Ziegler's method of estimating albumin, **25**, 1129.
 Conington, F. T., obituary notice of, **17**, 435.
 Cooper, J. T., catechuic acid, **11**, 45.
 — improvements in the instrument invented by the late Dr. Wollaston for ascertaining the refracting indices of bodies, **1**, 234.
 — obituary notice of, **8**, 109.
 de Coppet, L. C., preparation of super-saturated saline solutions, **24**, 619; **25**, 218.
 — supersaturation of sodium chloride solution, **25**, 284.
 — temperature of solidification of saline solutions, **25**, 1062.
 — action of low temperatures on the so-called supersaturated solutions of sodium sulphate, **25**, 465.
 Coquaend, H., the bauxites of the Alpine Chain (Bouches-du-Rhône), **25**, 127.
 Coray and Merz. See Merz.
 Cornu, A., reversal of the lines in the spectra of metallic vapours, **24**, 1142.
 Cornwall, H. B., detection of bismuth by the blowpipe in presence of lead and antimony, **25**, 1118.
 Cossa, A., formation of asparagin in vetches, **25**, 516.
 — chloropierin, **25**, 889.
 — hydrazincite of Auronzo, **24**, 893.
 Cowper, C., obituary notice of, **14**, 350.
 Crafts, J. M., ethers of arsenious and arsenic acids, **24**, 817.
 Crafts, J. M., and R. Silva, preparation and properties of the oxide of triethylphosphine, **24**, 629.
 Cranston and Dittmar. See Dittmar.
 Crawhall, W., obituary notice of, **3**, 97.
 Credener, H., certain causes of difference in crystals of carbonate of lime, **24**, 670.
 Creuse, J., estimation of citric acid, **25**, 179.
 Croft, H., cadmium salts, **1**, 104.
 — new oxalate of chromium and potash, **1**, 89.
 — decomposition of oxalic methyl-ether by alcohol, **1**, 19 (p).
 — manufacture of sugar from the *Zea Mays*, **1**, 48 (p).
 Crookes, W., selenocyanides, **4**, 12.
 — thallium, **17**, 112.

Crowder, W., estimation of nitrous acid in nitrous sulphuric acid, **25**, 173.
 Crum, W., acetates and other compounds of alumina, **6**, 216.
 — method of analysis for bodies containing nitric acid, **11**, 399.
 — action of bleaching powder on the salts of copper and lead, **11**, 387.
 — manner in which cotton-fibre unites with colouring matter, **16**, **1**, 404.
 — obituary notice of, **21**, xvii.

D.

Dale, John, jun., obituary notice of, **25**, 344.
 Dale, R. S., action of baryta on suberic and azelaic acids, **17**, 258.
 Dale, R. S., and C. Schorlemmer, on aurine, **24**, 466; **25**, 14.
 Dalzell and Thorpe, existence of sulphur-dichloride, **24**, 1163.
 Damour, A., idocrase from Arendal, **25**, 56.
 Dana, E. S., datolite from Bergen Hill, New Jersey, **25**, 995.
 — composition of the Labradorite rocks of Waterville, New Hampshire, **25**, 227.
 Dancer, W., hypobromous acid, **15**, 477.
 — constitution of wood-spirit, **17**, 222.
 Danckworth, W., examination of flour, **24**, 164.
 Danks's puddling furnace, **25**, 931.
 Danson, J., identity of bisulphamylic and hyposulphamylic acids, **3**, 158.
 — sulphites of potassium, chromium, lithium, and bismuth, **2**, 205.
 Danson, J., and F. Muspratt, manufacture of soda, and composition of salt-cake, black-ash, soda-ash, and soda-water, **2**, 216.
 Darcenberg and Mégevand. See Mégevand.
 Dareste, C., animal starch, **24**, 838.
 — starch in the testicles, **25**, 256.
 Darling, W. H., researches on dimethyl, **21**, 496.
 Darmstädter, L., chromium derivative obtained by heating potassium dichromate with concentrated nitric acid, **24**, 199.
 Daube, F. U., curcumin, **24**, 152.
 Daubeny, C. G. B., produce obtained from barley sown in rocks of various ages, **7**, 289.
 — occurrence of fluorine in recent, as well as in fossil bones, **11**, 97.

- Daubeny, C. G. B., ozone, **20**, 1.
 — variation in the proportion of potash and soda, in certain samples of barley grown in plots of ground artificially impregnated with alkalis, **5**, 9.
 — on the power ascribed to the roots of plants, of rejecting poisonous or abnormal substances presented to them, **14**, 209; **15**, 16.
 — obituary notice of, **21**, xviii.
- Daubrée, A., native iron from Greenland, **25**, 882.
 — examination of the meteorites which fell on July 28th, 1872, at Lance and at Anthon (Loire-et-Cher), **25**, 992.
 — examination of the meteorites of Ovikak in Greenland, with especial reference to the carbon which they contain, **25**, 993.
- Daughlish, J., obituary notice of, **19**, 511.
- Davidson, J., action of dibromide of ethylene on pyridine, **14**, 161.
- Davies, A. E., high and low estimations of soluble phosphates, **24**, 586.
 — C. E., estimation of nitrous acid in nitrous sulphuric acid, **25**, 173.
 — E., action of heat on ferric hydrate in presence of water, **19**, 69.
 — R. H., experiments on acid sulphite of magnesium, **25**, 673.
 — and Calvert. See Calvert.
- Davis, E. H., obituary notice of **25**, 345.
 — G. E., improvements in chlorimetry, **25**, 1039.
 — the logwood test for alum in bread, **25**, 923.
 — J. W. C., composition of the precipitate formed by adding a solution of ammonio-sodic phosphate to a solution of calcium chloride, **25**, 673.
 — composition of the crystalline deposit from a solution of magnesium and ammonium chloride, **25**, 671.
- Davy, E., obituary notice of, **11**, 184.
- Deacon, H., on Deacon's method of obtaining chlorine, as illustrating some principles of chemical dynamics, **25**, 725.
- Dean, H., and F. Wöhler, telluromethyl, **8**, 161.
- Deane, H., and H. B. Brady, microscopical research in relation to pharmacy, **18**, 34.
- Debray, H., glucinum and its compounds, **8**, 242.
- Debus, H., polyatomic alcohols, **12**, 222.
 — constitution of some carbon compounds, **19**, 17, 256.
- Debus, H., compounds and derivatives of glyoxylic acid, **18**, 193.
 — chemical examination of malder, **1**, 403.
 — conversion of prussic acid into methylamine, **16**, 249.
 — conversion of pyroracemic acid into lactic acid, **16**, 269.
 — action of sodium-amalgam on an alcoholic solution of ethylic oxalate, **25**, 365.
 — derivatives of xanthic acid, **3**, 84.
- Delherain, P., metamorphoses and migrations of the proximate principles in herbaceous vegetables, **24**, 577.
 — action of atmospheric nitrogen in vegetation, **25**, 164.
- De la Rue Thomas, obituary notice of, **20**, 387.
- De la Rue, Warren, agency of caloric in permanently modifying the state of aggregation of the molecules of bodies, **1**, 18 (p).
 — crystallised alloy of zinc, iron, lead, and copper, **11**, 293.
 — modification of the apparatus of Varrentrap and Will for the estimation of nitrogen, **111**, 347.
 — cochineal, **111**, 454.
 — new body obtained from cochineal, **111**, 110.
 — structure of electro-precipitated metals, **11**, 300.
- De la Rue, Warren, and Hugo Müller, new form of constant battery, **21**, 488.
 — some products of the action of dilute nitric acid on some hydrocarbons of the benzoyl series, **14**, 54.
 — resin of *Ficus rubiginosa*, and a new homologue of benzylic alcohol, **15**, 62.
 — some constituents of rhubarb, **19**, 298.
- Delffs, E., sorbite, **24**, 1043.
- Delffs, W., cenanthic ether and cenanthic acid, **5**, 279.
- De Luca and Berthelot. See Berthelot.
- Denton, J. H., sewage as a fertiliser of land, **25**, 172.
- Dermoy's puddle process, **25**, 1143.
- Desains, E., fusion of phosphorus, **1**, 183.
- Deselabrisse, C., preparation and uses of manganate and permanganate of potassium, **24**, 868.
- Descloizeaux, amblygonite and mon-tebrasite, **25**, 793.
- Dessaigues, V., formation of aspartic acid from bimalate of ammonia, **3**, 187.

- Dessaigues, V., methyluramine and its derivatives, **9**, 286.
- Detmer, M., bleaching salts, **1**, 6.
- W., absorption of humus bodies by plants, **25**, 1038.
- humus-substances of the soil, **25**, 521.
- respiration of the larvæ of *Tenebrio molitor*, **25**, 836.
- Deus and Klaye. See Klaye.
- Déville, C. Sainte-Claire, absence of combustible gas in the emanations of the Caldeira de Furnas, San Miguel, Azores, **25**, 885.
- Déville, H. Sainte-Claire, aluminium **8**, 239.
- physical properties and heating power of different petroleums from Russia, **24**, 453.
- action of water on iron, and of hydrogen on iron oxide, **24**, 103.
- Dewar, James, acidulous chalybeate water from Melrose, **25**, 60.
- oxidation-products of picoline, **24**, 144.
- Dietrich, manuring with powdered phosphorite, **25**, 839.
- and König, composition and digestibility of the substance associated with cellulose in the fibre of meadow-hay, **24**, 576.
- Ditte, A., influence exerted by the crystallisation of cadmium oxide on its heat of combination, **24**, 870.
- heat of combustion of magnesium, indium, cadmium, and zinc, **24**, 793.
- heat of combustion of magnesium and zinc, **24**, 643.
- spectra of bodies belonging to the nitrogen and chlorine groups, **24**, 1144.
- influence of the calcination of certain metallic oxides on the heat disengaged in their reactions, **24**, 869.
- sulphide of selenium, **24**, 995, 996.
- spectra of sulphur, selenium, and tellurium, **24**, 1146.
- Dittmar, W., vapour-tension of formate of ethyl and of acetate of methyl, **21**, 477.
- reduction of glutamic acid by hydriodic acid, **25**, 815.
- contribution to the history of the oxides of manganese, **17**, 294.
- dissociation of liquid sulphuric acid, **22**, 446.
- Dittmar, W. and B. Cranston, formation of carbonic ether, **22**, 441.
- Dittmar, W., and A. Kekulé, an aromatic glycollic acid, **24**, 375.
- Dittmar, W., and H. E. Rosecoe, absorption of hydrochloric acid and ammonia in water, **12**, 128.
- Divers, E., action of carbonate of ammonium on magnesium salts, **15**, 196.
- combinations of carbonic anhydride with ammonia and water, **23**, 171.
- precipitation of solutions of ammonium carbonate, sodium carbonate, and ammonium carbamate by calcium chloride, **23**, 359.
- spontaneous conversion of gun-cotton into pectic and parapectic acids, **16**, 91.
- salts of nitrous oxide, **24**, 484.
- action of heat on silver nitrite, **24**, 85.
- Djünberg, L., ceroso-ceric oxide as a test for strychnine, **25**, 845.
- Dmochowsky, liquid bromotoluene, **25**, 1091.
- Dock, F. W., the glycogenic function of the liver, and its relation to diabetes, **25**, 901.
- Dogiel and Huppert. See Huppert.
- Dollfus, researches into the combinations of several organic bases with hydrosulphocyanic, hydroferrocyanic, and hydroferriocyanic acids, **1**, 405.
- E. and A., Peru gum as thickening material for printing, **24**, 768.
- Donders, F., the chemistry of respiration, a process of dissociation, **25**, 252.
- van Dorp, A., dimethylantracene, **25**, 1006.
- van Dorp and Liebermann. See Liebermann.
- Draper, J. C., separation by heat of arsenic from arseniated hydrogen in Marsh's apparatus, **25**, 1042.
- use of magnesium in Marsh's test for arsenic, **25**, 1042.
- Draper, J. W., distribution of heat in the spectrum, **25**, 968.
- Drayton's method of covering glass by precipitation with a coating of metallic silver, **11**, 128.
- Drechsel, E., reduction of carbonic acid to oxalic acid, **21**, 121.
- reactions of pyrosulphuric acid, **25**, 669.
- Drechsel and Finkelstein, phosphorus bases, **24**, 568.
- Drechsler, analysis of bauxite from the Wochein (Austria), **25**, 467.
- Drinkwater, J., preparation of absolute alcohol, and composition of proof spirit, **11**, 477.
- Dubrunfaut, M., production of ammonia in alcoholic fermentation, **24**, 916.
- preservation of eggs, **24**, 866.

- Dubrunfaut, M., composition of milk and preparation of artificial milk, **24**, 865.
 ————suet and the alimentary fats, **24**, 459.
 Duclaux, E., iodide of starch, **25**, 299, 657.
 Duffy, P., isomeric transformations of fats, **5**, 197.
 ————constitution of stearin, **5**, 303.
 Dulk and Meyer. See Meyer.
 Dumas, J., analysis of atmospheric air, **1**, 13 (p).
 ————combustion of carbon in oxygen, **25**, 383.
 ————constitution of milk and blood, **24**, 838.
 ————modification of his method of taking vapour-density, **15**, 149.
 Dunnington, F. P., composition of the deposit from the retorts in which carbon disulphide has been made, **25**, 674.
 ————analysis of genthite (nickel-gymnate) from N. Carolina, **25**, 680.
 Duppa and Frankland. See Frankland.
 Duppa and Perkin. See Perkin.
 Dupré, A., changes in the proportion of acid and sugar present in grapes during the process of ripening, **20**, 378.
 ————elimination of alcohol, **25**, 514.
 ————estimation of compound ethers in wine, **20**, 493.
 ————synthesis of formic and hyposulphurous acids, **20**, 291.
 ————effects produced by the addition of plaster of Paris to must, **20**, 403.
 Duquesnel, H., crystallised aconitine, **24**, 941.
 ————and Gréchant. See Gréchant.
 Durocher, Malaguti, and Sarzeaud, presence of lead, copper, and silver in sea-water, and existence of the latter in plants and animals, **3**, 68.
 Dusart L., new mode of producing propylene, **8**, 305.
 ————some derivatives of naphthalin, **8**, 303.
 Dusart, L., and C. Bardy, contributions to the history of the phenols, **25**, 135, 620.
 ————transformation of phenol into alkaloids, **25**, 247.

E.

- Ebelmen, M., new method of obtaining crystalline substances in the "dry way," and application of this method to the production of artificial minerals, **1**, 181.

- Ebelmen, M., observations on the reduction of iron in the blast furnace, **22**, 207.
 ————formation of tribasic ether, **III**, 252.
 Edger and Glendinning. See Glendinning.
 Edlund, E., researches on the electromotive force in the contact of metals, and on the modification of that force by heat, **25**, 379.
 Edwards, J. B., action of arsenious acid on albumin, **3**, 14.
 Eghis, A., action of sodium-amalgam on oxalic ether, **24**, 820.
 Eich, L., on Kröncke's method of amalgamating silver ores, **24**, 447.
 Ekin, C., origin of nitrates in potable waters, **24**, 64.
 Elliot, A. H., determination of the "total carbon" in cast iron, **22**, 182.
 ————W. H., estimation of sulphur in cast iron, **24**, 159.
 van Embden and Mulder. See Mulder.
 Emery, R., relative proportion of iron and sulphur in the pyrites of Iowa coal, **25**, 228.
 Emmerling, A., and C. Engler, derivatives of acetophenone, **24**, 258.
 Emmerling and Jacobsen. See Jacobsen.
 Engelhardt, A., difference between lactic acid produced by the fermentation of sugar and that contained in the juices of flesh, **1**, 400.
 Engelhardt, A., and P. Latschinow, bromo- α -sulphothymolic acid, **24**, 1054.
 ————chrysanisic acid, **24**, 1054.
 ————derivatives of diphenyl, **24**, 1053.
 Engler, C., bromobenzonitrile, **24**, 923.
 Engler and Emmerling. See Emmerling.
 Erdmann and Marchand, mellitic acid, **1**, 382.
 Erdman, Nobbe, and Schroeder. See Nobbe.
 Erdman, C. L., obituary notice of, **23**, 306.
 Erk, R., on the cerite metals, **24**, 494.
 Erlenmeyer, E., preparation of absolute alcohol, **25**, 133.
 ————acids obtained by oxidation of fermentation butylic alcohol, **24**, 125.
 ————synthesis of substituted guanidin s, **24**, 143.
 ————formation of a methyl-isethionie acid, **24**, 553.
 ————oxygenated ethyl-compounds, **25**, 605.
 ————sarcolactic acid, **24**, 546.

- Erlenmeyer, E., the different valeric acids, **24**, 126.
 Erlenmeyer, E., and C. Hell, valerianic acid from various sources, **25**, 242.
 Erlenmeyer, E., and J. A. Wanklyn, hexyl group, **16**, 221; **17**, 190.
 ——— products of the oxidation of the β -hexyl group, **16**, 307.
 ——— constitution of melampyrin, **15**, 456.
 Ermolaïen, M., a new amylene, **24**, 1036.
 Ernst, F., and C. Zwenger, gallic ethers, **24**, 821.
 Eschea, A., estimation of mercury in its ores, **25**, 926.
 Estor, A., and C. Saint-Pierre, analysis of the gases of the blood, **25**, 265.
 Ettling, sulphantimonate of copper and zinc, **6**, 110.
 Eulenberg and Wohl. See Wohl.
 Evans, A. S., chromate of copper, **2**, 218.
 Everitt, T., preparation of malic acid, from the leaf-stalks of garden rhubarb, **1**, 193.
 Evre, E. St., new saline compound of cobalt, **7**, 86.
 Ewerhof, F., sulphethers of ethylene, **24**, 1198.
 Exner, A., synthesis of nitrogen tetroxide, **25**, 1072.

F.

- Fahlberg, C., estimation of calcium sulphide in bone charcoal, **25**, 264.
 Fairbairn, Sir W., alleged action of cold in rendering iron and steel brittle, **24**, 444.
 Fairley, T., action of hydrogen on organic polycyanides, **17**, 362.
 Fairlie, J., constitution of commercial creasote from coal-tar, **7**, 232.
 Fairrie, A. J., chromate of aluminium, **4**, 301.
 ——— chromic acid and sesquioxide of manganese, **4**, 300.
 Faraday, Michael, obituary notice of, **21**, XXI.
 Faust, A., an isomeric chlorophenol, **25**, 62.
 ——— frangulic acid a derivative of anthracene, **25**, 78.
 ——— derivatives of phthalic acid, **25**, 75.
 Favre, P. A., electric conduction by liquids without electrolysis, **25**, 209.
 ——— thermal effects produced during the electrolysis of the hydric acids, **25**, 25.
 Favre, P. A., thermic researches on the electrolysis of the alkaline bases and sulphates, **24**, 985; **25**, 110, 111.
 ——— thermic researches on voltaic energy, **24**, 1134, 1136.
 Favre, P. A., and Silbermann, researches on the quantities of heat disengaged in chemical and molecular actions, **6**, 234.
 ——— thermo-chemical determinations made with the mercury calorimeter, inaccuracy of, according to Thomsen, **24**, 878.
 Favre, P. A., and C. Valson, crystalline dissociation, **25**, 22, 1068.
 Fehling's copper-solution, experiments with, **25**, 1122.
 Feichtinger, on L. Schweiger's new painting ground for stereochromic pictures, **24**, 1222.
 Fellengberg-Rivier, L. R., analysis of nephrite and saussurite, **24**, 324.
 Feltz, E., the part played by the salts and uncrystallisable sugar in the generation of molasses, **24**, 456.
 Ferguson, W., increase in weight of molasses casks, occasionally arising from absorption, **6**, 122.
 ——— power of low pressure steam in charring animal and vegetable matter, **1**, 41.
 Ferrière, E., action of ether on iodides, **25**, 923.
 Ficinus, O., cheap preparation of pure dextrin, **24**, 1099.
 Fick, A., destiny of peptones in the blood, **25**, 254.
 Fick, A., and J. Wislicenus, amount of work performed by, in the ascent of the Faulhorn, as compared with the amount of muscle consumption, **21**, 40.
 Field, F., alodonite, a new mineral containing arsenic and copper, **10**, 289.
 ——— natural alloy of silver and copper, from Chile, **3**, 29.
 ——— arsenates of barium, calcium, and magnesium, and the separation of arsenic from other elements, **11**, 6.
 ——— composition of the ashes of the cactus, **3**, 57.
 ——— composition of a specimen of atacamite from the province of Copiapo, Chile, **7**, 193.
 ——— basic carbonates of copper, **14**, 70.
 ——— basic carbonates of copper, with some remarks on the carbonates of nickel and cobalt, **14**, 48.
 ——— general distribution of bismuth in copper minerals, **14**, 304.

- Field, F., products of the decomposition of cuminate of ammonium by heat, III, 404.
- action of heat on the oxychloride of copper (atacamite), **9**, 140.
- action of hydrochloric acid upon sulphide of mercury in presence of certain other substances, **12**, 158.
- separation of iodine, bromine, and chlorine, and the comparative degree of affinity of these elements for silver, with some analyses of their combinations with that metal occurring in Chile, **10**, 234.
- description of *Lapis lazuli* found in large quantities on the Cordilleras of the Andes, **4**, 331.
- analysis of a meteoric stone from the desert of Atacama, **9**, 143.
- minerals from Chile, **14**, 153.
- minerals containing arsenic and sulphur, from Chile, **12**, 8.
- analysis of a mineral containing gold, from the province of Coquimbo, Chile, **4**, 332.
- native combinations of oxide of mercury with oxide of antimony, **12**, 27.
- examination of slags from copper smelting furnaces, **2**, 220.
- solvent power exercised by a solution of hyposulphite of soda upon many salts insoluble in water, **16**, 28.
- sulphate of alumina, from Iquique, Peru, **22**, 259.
- double sulphides of copper and iron, **15**, 125.
- Field and Abel. See Abel.
- Filhol, E., and J. Mellies, action of iodine on insoluble sulphides, **24**, 887.
- Finck, C., French dressing for cotton cloth, **24**, 969.
- Finkelstein and Drechsel. See Drechsel.
- Finno, W., sea-weed as a manure, **25**, 1111.
- Fischer, F., lecture experiments, **25**, 594.
- Fisher, N. W., nitrites, **1**, 384.
- Fisher and Glutz. See Glutz.
- Fittbogen, J., observations relative to the life of the barley-plant, **24**, 578.
- Malden island guano, **25**, 1112.
- products of the manufacture of starch and sugar, **25**, 1136.
- Fittig, R., bromobenzenesulphonic acid, **25**, 215.
- the nomenclature of the aromatic compounds, **25**, 472.
- action of sodium on bromotoluene, **24**, 1029.
- Fittig, R., and J. B. Barringer, sorbic and parasorbic acids, **25**, 486.
- Fittig, R., and T. Macalpine, ethylene-protocatechuic acid, **24**, 1051.
- Fittig, R., and W. Ramsay. See Ramsay.
- Fittig, R., and I. Remsen, constitution of piperine, and its decomposition products, **24**, 934.
- synthesis of piperonylic acid and a new mode of preparing protocatechuic aldehyde, **24**, 1050.
- Fitz, A., grape-seed oil, **24**, 703.
- Flajolot, M., crystalline compounds of lead antimonite and antimonate from Constantine, **24**, 1016.
- Fleek, H., estimation of ammonia in well and river water, **25**, 1041.
- gas-washing and gas-absorbing apparatus, **24**, 797.
- malting without germination, **24**, 458.
- use of a reflector in spectrum analysis, **24**, 857.
- Fleischer, A., action of potassium permanganate on tartaric acid, **25**, 608.
- isomeric modification of potassium sulphocyanate, **24**, 391.
- E., amount of combined water in crystallised ammonio-ferrous sulphate, **25**, 1079.
- Fleischmann, W., researches on milk, **25**, 258.
- Fleitmann, T., qualitative separation of tin, antimony, and arsenic, **4**, 329.
- Fleitmann, T., and W. Henneberg, phosphates, **1**, 384.
- Flight and Maskelyne. See Maskelyne.
- Flückiger, F. A., the crystalline principle of aloes, **25**, 299.
- *Argemone mexicana*, **24**, 154.
- the so-called false cinchona barks, **25**, 721.
- fluorescence of peppermint-oil, **24**, 154.
- manna (Eichenmanna, oak manna, or ordinary manna from the ash tree) from Kurdistan, **25**, 813.
- mustard-oil, **24**, 835.
- *Nigella* seeds or black cummin, **24**, 1067.
- distinction between phenol and creasote, **25**, 928.
- presence of pyrocatechin in kino, **25**, 296.
- some reactions of quinine and morphine, **25**, 1043.
- starch and cellulose, **24**, 543.
- some reactions of water-glass, **24**, 492.

- Follenius and Tuchsmidt. See Tuchsmidt.
- Forbes, D., chemical geology, **21**, 214.
- Ford, A., dyeing of caoutchouc, &c., with aniline colours, **24**, 971.
- Fordos, M., cyanic compound obtained from gun-cotton by, **11**, 261.
- and Gélis, acids of sulphur, **1**, 75.
- — analysis of the oxygen-compounds of sulphur, **1**, 75.
- Forster, A., phosphorescence produced by increase of temperature, **25**, 119.
- R. W., on Dr. Keller's supposed formation of metacetic acid by means of flour and leather, **5**, 28.
- Foster, G. C., acetoxybenzamic acid an isomer of hippuric acid, **13**, 235.
- piperic and hydropiperic acids, **15**, 17.
- Foster and Matthiessen. See Matthiessen.
- Fownes, G., preparation of ether, **1**, 56 (p).
- preparation of hippuric acid, **1**, 33 (p).
- analysis of organic substances containing nitrogen, **1**, 41 (p).
- presence of phosphoric acid in the felspar of Jersey, **11**, 256.
- examination of two specimens of South Sea Guano, **1**, 36 (p).
- action of sulphuric acid on ferrocyanide of potassium, **1**, 251.
- preparation of artificial yeast, **1**, 100.
- Franchimont, A., and Th. Zincke, hexyl alcohol from essential oil of Heracleum, **25**, 61.
- — nonylic acid from the octyl alcohol of Heracleum oil, **25**, 300.
- Francis, W., action of alkalis on wax, **1**, 248.
- determination of nitrogen in organic analysis, **1**, 44 (p).
- Francis and Bolas. See Bolas.
- Frankland, E., composition of air from Mont Blanc, **13**, 22.
- influence of atmospheric pressure on some of the phenomena of combustion, **15**, 168.
- igniting point of coal-gas, **16**, 398.
- development of fungi in potable waters, **24**, 66.
- contributions to the knowledge of the manufacture of gas, **5**, 39.
- simple apparatus for determining the gases incident to water analysis, **21**, 109.
- note on Mr. Adie's paper on "ground-ice," **14**, 113.
- combustion of iron in compressed oxygen, **17**, 52.
- Frankland, E., chemical constitution of metacetic acid and some other bodies related to it, **11**, 386.
- origin of muscular power, **21**, 33.
- new series of organic acids containing nitrogen, **11**, 79.
- new series of organic compounds containing nitrogen, **15**, 363.
- new series of organic bodies containing metals, **6**, 57.
- new series of organic bodies containing metals and phosphorus, **2**, 297.
- isolation of the organic radicals, **2**, 263.
- researches on the organic radicals; Part II, amyl, **3**, 30.
- researches on the organic radicals; Part III, action of solar light upon iodide of methyl, **3**, 322.
- contributions to the notation of organic and inorganic compounds, **19**, 372.
- organo-metallic bodies, **13**, 177.
- water supply of the metropolis during the year 1865-66, **19**, 239.
- Frankland, E., and H. E. Armstrong, analysis of potable waters, **21**, 77.
- Frankland, E., and B. F. Duppa, researches on acids of the acrylic series.—No. 1, transformation of the lactic into the acrylic series of acids, **18**, 133. No. 2, synthesis of acids of the lactic series, **22**, 28.
- — synthetical researches on ethers.—No. 1, synthesis of ethers from acetic ether, **19**, 395.—No. 2, action of sodium and isopropyl iodide upon ethylic acetate, **20**, 102.
- — new method of producing the mercury-compounds of the alcohol radicals, **16**, 415.
- — reaction for the production of the zinc-compounds of the alcohol-radicals, **17**, 29.
- Frankland, E., and H. Kolbe, products of the action of potassium on cyanide of ethyl, **1**, 60.
- Frankland, E., and W. J. Ward, improved apparatus for the analysis of gases, **6**, 197.
- Franz, B., specific gravities of aqueous solutions, **23**, 975.
- Frapolli and Chiozza, coumaramine, a new organic base derived from nitrocoumarin, **8**, 301.
- Frapolli, Lepetit, and Padulli, colouring matter found in the urn of St. Ambrose at Milan, **25**, 1103.
- Freese, C., iron phosphides, **25**, 881.
- Frémy, E., researches on the hydrates, **1**, 380.

- Frémy, E., new researches on the metals accompanying platinum in the ore, **7**, 256.
- pectin, the gelatinous principle of vegetables, **1**, 409.
- Frémy, E., and M. Becquerel, electrochemical researches on the properties of electrified bodies, **5**, 272.
- Frenzel, A., heterogenite, **25**, 990.
- hypochlorite, **25**, 132.
- lithiophorite, **24**, 205.
- myelin, **25**, 989.
- meneghinite, **24**, 671.
- plumbostib and embrithite from Nertschinsk, **24**, 671.
- pucherite, **25**, 131.
- Fresenius, F., Bailey's new process of bleaching with sulphurous acid, **24**, 452.
- Fresenius, H., corallin, **25**, 705.
- Fresenius, R., improved method for the detection and quantitative determination of arsenic, **11**, 129.
- inorganic constituents of plants, **11**, 179.
- solubility of gelatin in glycerin, **24**, 724.
- quantitative estimation of hydrogen sulphide in presence of carbon dioxide, **24**, 582.
- estimation of lime, **25**, 263.
- recovery of molybdic acid from residues, **24**, 1092.
- analysis of phosphatic manures, **25**, 326.
- chemical examination of some specimens of wine from the Rheingau, **1**, 78.
- Freund, A., products of the acid fermentation of wheat-bran, **24**, 515.
- Friedel, C., silicon hexbromide and hexchloride, **25**, 40.
- subchloride of silicon, **24**, 998.
- Friedel, C., and A. Ladenburg, silicichloroform and its derivatives, **25**, 153.
- — silicopropionic acid, **24**, 918.
- Friedel, C., and R. D. Silva, action of chlorine on isopropyl chloride, **25**, 134, 296.
- — preparation of propylene chloride and chlorobromide, **25**, 889.
- — third dichlorinated propylene, **25**, 805.
- — action of iodine protochloride and of bromine on chloroform, **25**, 888.
- — action of chlorine on various bodies of the 3-carbon group—isomerides of trichlorhydrin, **24**, 1190.
- — isomerides of trichlorhydrin and reproduction of glycerin, **25**, 339.
- Friedländer, S., action of sodium-amalgam on oxalic ether, **24**, 908.
- Frierichs and Wöhler, changes which organic substances suffer on their passage into the urine, **1**, 421.
- Friswell, R. J., a new double-salt of thallium, **24**, 461.
- Fritzsche, C. J., obituary notice of, **25**, 345.
- J., a peculiar state of the molecules of tin, **25**, 989.
- Frölich, *Argemone mexicana*, **24**, 154.
- Froiep, A., the connective tissue of invertebrata, **25**, 633.
- Frühling, H., colouring of cemented work, **24**, 451.
- Frühling and Hohmann. See Hohmann.
- Fua, C., purification of fats and suets from slaughter-houses for use as food, **24**, 460.
- Fürstenau, C., notes on ultramarine, **24**, 969.
- Furze, J. N., fermentation, **11**, 21.

G.

- Gaiffe, M., new galvanic element of economical construction, **25**, 971.
- Gal, H., brominated derivatives of acetic anhydride, **24**, 231.
- Galletly, J., a paraffin having a high melting point, **24**, 1183.
- Galloway, R., analysis of the water of the thermal spring of Bath, **11**, 262.
- Gamgee and Wanklyn. See Wanklyn.
- Ganser, J. B., ergot, **24**, 726.
- Garrod, A. B., conversion of benzoic acid into hippuric acid in the animal economy, **1**, 79; **1**, 22 (p).
- Gaugain, J. M., electromotive force developed by the contact of metals and inactive liquids, **25**, 662.
- Gautier, M., egg-albumin, **24**, 573.
- Gay-Lussac, aqua regia, **1**, 340.
- Gay-Lussac's method of taking vapour-densities, modification of, **15**, 143.
- v. Gegerfelt, H., the so-called glycerin-ether, **25**, 134.
- v. Gehren and Schmitt. See Schmitt.
- Geinitz, H. B., astracanite from Stassfurt, **25**, 125.
- Gélis, A., cyanic compound obtained from gun-cotton, **11**, 261.
- and Fordos. See Fordos.
- Genth, discovery of pure oxide of nickel in the scum arising from the smelting of copper, **11**, 384.
- Gerhardt, C., researches on the anhydrous organic acids, **5**, 226.

- Gerhardt, C., amides, **6**, 193.
 — ethylmercuric nitrate, **5**, 88.
 — researches on the constitution of organic acids, **5**, 127.
 — new compounds of salicyl, **1**, 60.
 Gerhardt, C., and A. Laurent, action of ammoniacal chloroplatinate of ammonium, **3**, 176.
 — — two derivatives of morphine and narcotine, **1**, 408.
 Gerhardt, C., obituary notice of, **10**, 187.
 Gerland, B. W., behaviour of sulphurous acid to phosphates and similar compounds, **25**, 39.
 Gerland, E., action of light on chlorophyll, **25**, 160.
 Gerland, E., and N. Rauwenhoff, chlorophyll and some of its derivatives, **24**, 1201.
 Gerland, H., new formation of salicylic acid, **5**, 133.
 Gernez, D., absorption-spectra of chlorine and chloride of iodine, **25**, 462.
 — absorption-spectra produced by solutions of nitrogen tetroxide, chlorine tetroxide, and chlorine trioxide, **25**, 280.
 — absorption-spectra of the vapours of selenium, of selenious chloride and bromide, of tellurous chloride and bromide, of iodine bromide, and of alizarin, **25**, 665.
 — absorption-spectra of the vapours of sulphur, selenious anhydride, and hypochlorous anhydride, **25**, 382.
 Geromont, F., constitution of allyl-compounds, **24**, 697.
 — isobutyric acid from citradibromopyrotartaric acid, **25**, 814.
 Geuther, A., composition of antimonious hydrate, **25**, 223.
 — chlorine derivatives of ethyl chloride, **24**, 512.
 — ethyldiacetic acid, **24**, 812.
 — nitrosodiethylin, **25**, 233.
 — decomposition of phosphorous chloride by water, **25**, 223.
 — action of sodium on a mixture of phosgene ether and ethyl iodide, **25**, 607.
 — action of sodium alcoholate on benzoic ether, **25**, 244.
 — tribasic acetic ether, **24**, 815.
 Geuther, A., and A. Michaelis, quantivalence of phosphorus, and action of PCl_3 and Br on benzoic acid, **24**, 552.
 — solidification of phosphoryl trichloride and phosphoryl bromodichloride, **24**, 1162.
 Geyer, W. E., a new sensitive singing flame, **25**, 875.
 Geyger and Hofmann. See Hofmann.
 Gianetti, C., detection of iodine in the state of potassium iodide in urine, **25**, 1124.
 Gibsons, B. W., description of an apparatus for preventing the escape of sulphuretted hydrogen, **20**, 415.
 Gilbert, J. H., clover sickness, **25**, 916.
 — discourse on the composition of the animal portion of our food, and on its relation to bread, **12**, 54.
 — observations on soil analysis, manures, and loss of plant-food by drainage, **24**, 294.
 Gilbert and Lawes. See Lawes.
 Gilkowsky, C., retardation of the precipitation of barium sulphate in presence of nitric acid and ammonium nitrate, **25**, 1113.
 Gill, C. H., laboratory notes on the examination of glucose-containing sugars, **21**, 91.
 — saline compounds of cane-sugar, **24**, 269.
 Gill, C. H., and E. Meussell, paraffin and the products of its oxidation, **21**, 466.
 Gintl, W. F., adulteration of aniline colours, **25**, 939.
 — preparation of carbonyl cyanide, **25**, 118.
 Girard, A., salt-gardens and salt trade of Portugal, **25**, 846.
 — sweet volatile principle in the caoutchouc of Borneo, **24**, 915.
 — C., new method of preparing alizarin from paranaphthalene, anthracene, and their homologues, **25**, 1138.
 Girard, C., and G. de Laire, manufacture of aniline colours without arsenic, **25**, 938.
 — formation of diphenylamine, **25**, 626.
 — facts relating to diphenylamine, **25**, 417.
 — certain reactions of the sulphoacids of phenol, **25**, 116.
 Girard, C., and G. Vogt, secondary monamines of the aromatic series, **25**, 1025.
 — formation of secondary monamines by the action of bases of the formula, $\text{C}_n\text{H}_{2n-7}\text{H}_2\text{N}$, on naphthylamine hydrochloride, **24**, 1059.
 Girard, Millot, and Vogt, nitroglycerin and various dynamites, **24**, 769.
 Girard, E., the sulpho-urea corresponding to pseudotochuidine, **25**, 720.
 Gladstone, G., dust thrown out by Vesuvius in the eruption of April, 1872, **25**, 1081.

- Gladstone, J. H., circumstances modifying the action of chemical affinity, **9**, 54.
- circular polarization, **13**, 254.
- colour of chloride of copper in different states of hydration, **8**, 211.
- chlorophosphuret of nitrogen, and its products of decomposition, **3**, 135, 353.
- compounds of cotton with the alkalis, **5**, 17.
- optical test for didymium, **10**, 219.
- note on crystallised glycerin, **20**, 384.
- chemical history of gun-cotton and xyloidine, **III**, 412.
- the explosive compound usually denominated iodide of nitrogen, **4**, 34.
- the so-called iodide and chloride of nitrogen, **1**, 51.
- nitrates of bismuth and copper, **III**, 480.
- essential oils, **17**, 1; **25**, 1.
- compounds of phosphorus and nitrogen, **2**, 121.
- compounds of phosphorus containing nitrogen, **22**, 15.
- use of the prism in qualitative analysis, **10**, 79.
- pyrophosphodiamic acid, **19**, 290.
- pyrophosphotriamic acid, **19**, 1.
- pyrophosphoric acid, **20**, 435.
- pyrophosphoric amides, **21**, 64.
- specific refractive energy of elements and their compounds, **18**, 108.
- refraction-equivalents, **23**, 101.
- refraction-equivalents of the aromatic hydrocarbons and their derivatives, **23**, 147.
- experiments illustrative of the reciprocal decomposition of salts, **9**, 141; **15**, 303.
- analysis of sand from St. Michael's Bay, Normandy, **III**, 257.
- corrosive action of sugar on iron and other metals, **7**, 195.
- compound sulphate of potash and soda, **6**, 106.
- action of sulphur on the pentachloride of phosphorus, **3**, 5.
- tetraphosphoric amides, **21**, 261.
- artificial formation of urca from fulminic acid, **1**, 228.
- chemical action of water on soluble salts, **11**, 36.
- Gladstone, J. H., and J. D. Holmes, action of ammonia on sulphochloride of phosphorus, **18**, 1.
- chlorophosphuret of nitrogen, and its products of decomposition, **17**, 225.
- Gladstone, J. H., and A. Tribe, corrosion of copper plates by nitrate of silver, **24**, 1008.
- — a law in chemical dynamics, **24**, 1123.
- — action of oxygen on copper nitrate in a state of tension, **25**, 674.
- — decomposition of water by zinc in conjunction with a more negative metal, **25**, 461.
- Glaser and Graebe. See Graebe, **25**.
- Glassford, C. F. O., cyanides of the metals, and their combinations with cyanide of potassium: Part I, cyanide of gold, **II**, 82; Part II, cyanide of silver, **II**, 92.
- Glassner, G., examination of wines, **25**, 530.
- Glendinning and Edger, estimation of sulphur by barium, **24**, 1088.
- Glutz, L., and E. Fiseher, chloro- and cyano-acetone, **24**, 921.
- Gmelin, L., combinations of the sesquioxide of manganese, **1**, 389.
- obituary notice of, **7**, 144.
- Gobin, use of dynamite for blasting, **25**, 1144.
- Görgey, solid volatile fatty acids of cocoa-nut oil, **1**, 404.
- Gössmann, C. A., and E. Atkinson, lophine, **9**, 220.
- Gössmann and Scheven, new mode of formation of ethylamine, amarine, and lophine, **8**, 161.
- — hypogaic acid, a new fatty acid obtained from earth-nut oil, **8**, 279.
- Goodman, J., origin of fibrin and its sources in the organism, **25**, 157.
- Goppelsroeder, F., contribution to the chemistry of atmospheric deposits; amounts of nitrates in spring, brook, river, and lake-water, **25**, 786.
- normal constituents of rain-water and snow, and estimation of nitric acid, **25**, 324.
- Goppelsröder, F., fluorescence, **24**, 482.
- Gorceix, F., the gases of Solfataras, **25**, 469.
- gases evolved from the volcanic island of Santorin after the eruption of 1866, **25**, 885.
- condition of Vesuvius, and composition of gases evolved in the Campi Flegrei (1869), **25**, 884.
- Gore, G., determination of alkalis in fire-clay and fire-bricks, **55**, 104.
- properties of electro-deposited antimony, **16**, 365.
- properties of liquid carbonic acid, **15**, 163.

- Gore, G., hydrofluoric acid, **22**, 368.
 — silver fluoride, **25**, 790.
 — solvent power of liquid cyanogen, **25**, 803.
 — thermo-electric action of liquids and metals, **24**, 476.
 v. Gorup-Besanez, E., some reactions of cholic acid, **24**, 381.
 — on an enormous proportion of earthy matter in a human lung, **24**, 424.
 — improved method of preparing glycocholic acid, **24**, 382.
 — explosion of nitro-glycerin, **24**, 347.
 — ozone reactions in the neighbourhood of graduation-houses for salt evaporation, **25**, 384.
 — pyrocatechin an element of living plants, **25**, 171.
 — the dolomitic springs of the Franconian Jurassic formation, **25**, 59.
 v. Gorup-Besanez, E., and F. Grimm, synthesis of rue-oil, **24**, 387.
 Gossleth, G., and J. F. Brazier, caproic and oenanthylic acids, **3**, 210.
 Gottlieb, J., monochlorocitromalic acid, **25**, 78.
 Gould, W., preparation of methylic alcohol, **7**, 311.
 Grabowski, J., naphthol-compounds, **24**, 1041.
 Gräbe, C., new class of alcohols, **24**, 222.
 — aromatic additive compounds, **25**, 1008.
 — synthesis of carbazol, **25**, 626.
 — pyrene, **24**, 117, 690.
 — determination of the relative positions of the substituted radicals in aromatic compounds, **24**, 671.
 — vapour-densities of certain organic compounds of high boiling point, **25**, 295.
 Gräbe, C., and E. Borgmann, eugenol and dimethoxybenzoic acid, **24**, 704.
 Gräbe, C., and H. Caro, aniline, **24**, 145, 708.
 Gräbe, C., and C. Glaser, carbazol, **25**, 302.
 Gräbe, C., and C. Liebermann, derivatives of anthracene, **25**, 139.
 Graeger, N., estimation of the strength of bleaching powder, **25**, 91.
 — analysis of drinking waters by a titrated soap-solution, **25**, 812.
 — double salts of ferrous sulphate, **25**, 1078.
 — easy determination of fat and alkali in soft soaps, **24**, 969.
 — N., treatment of fruit-juices, **24**, 1100.
 Gräger, N., reduction of silver-chloride in the wet way, **24**, 499.
 — recovery of silver-nitrate from the silver-bath, **24**, 500.
 Graham, J., obituary notice of, **22**, v.
 — T., absorption and dialytic separation of gases by colloid septa, **20**, 235.
 — capillary liquid transpiration in relation to chemical composition, **15**, 427.
 — preparation of chlorate of potash, **1**, 5 (p).
 — etherification, **3**, 24.
 — eudiometric process for the absorption of oxygen gas from atmospheric air, **11**, 46.
 — chemical report on the cause of the fire in the "Amazon," **5**, 34.
 — composition of the fire-damp of the Newcastle coal-mines, **11**, 7.
 — heat disengaged in combinations, **1**, 106; **11**, 51.
 — relation of hydrogen to palladium, **22**, 419.
 — supply of iodine from the kelp of Guernsey, **11**, 252.
 — applications of the refuse lime of gas-works, **11**, 358.
 — diffusion of liquids, **3**, 257; **4**, 83.
 — application of liquid diffusion to produce decomposition, **3**, 60.
 — liquid diffusion applied to analysis, **15**, 216.
 — speculations concerning the nature of matter, **17**, 368.
 — molecular mobility of gases, **17**, 334.
 — osmotic force, **8**, 43.
 — reply to the observations of M. Pierre on the proportion of water in the magnesian sulphates and double sulphates, **11**, 110.
 — existence of phosphoric acid in the deep-well water of the London basin, **11**, 392.
 — division by 3, of the equivalents of the phosphorus family of elements, **1**, 44 (p).
 — properties of silicic acid and other analogous colloidal substances, **17**, 318.
 — constitution of the sulphates as illustrated by late thermometrical researches, **1**, 82.
 — obituary notice of, **23**, 293.
 — T., and A. W. Hofmann, alleged adulteration of pale ales by strychnine, **5**, 173.
 Graham, T., A. W. Hofmann, and T. Redwood, report upon original gravities, **5**, 229.

- Graham, Hofmann, and Redwood, report on the supply of spirit of wine free from duty for use in the arts and manufactures, **8**, 120.
- Graham, Miller, and Hofmann, chemical report on the supply of water to the metropolis, **4**, 375.
- Graham, Stenhouse, and Campbell, chemical report on the mode of detecting vegetable substances mixed with coffee for the purpose of adulteration, **9**, 33.
- Gray, J. St. Clair, distillation of deposit in Reinsch's process from salts of mercury, **24**, 161.
- Gregory, W., preparation of alloxan, **III**, 42.
- preparation of creatine, and the proportions of that substance contained in different kinds of flesh and fish, **1**, 25.
- preparation of hippuric acid, **III**, 330.
- simple and cheap method of preparing pure hydrochloric acid of any required strength, **1**, 7 (p).
- new phosphate of magnesia, **II**, 310.
- new method of obtaining pure silver in the metallic state, or in the form of oxide, **1**, 190.
- chemical history of the products of decomposition of uric acid, **II**, 9.
- obituary notice of, **12**, 172.
- Gréchant, N., comparative researches on the absorption of gases by the blood: estimation of hæmoglobin, **15**, 1030.
- respiration of fishes, **25**, 637.
- Gréchant and Duquesnel, physiological action of crystallised aconitine, **24**, 948.
- Greiff and Braun. See Braun.
- Grewingk, C., formation of azurite, **24**, 208.
- the great phosphorite zone of Russia, **25**, 58.
- Griess, P., amidodraconic and carbox-amidodraconic acid, **25**, 711.
- isomeric iodobenzoic acids, **24**, 702.
- new series of bodies in which nitrogen is substituted for hydrogen, **18**, 268, 298; **19**, 57; **20**, 36.
- a new phenylene diamine, **24**, 562.
- two new isomeric sulpho-acids of amidobenzoic acid, **25**, 717.
- derivatives of uramidobenzoic acid, **52**, 497.
- ethylic ethers of uramidobenzoic and carboxamidobenzoic acid, **25**, 81.
- Griess, P., uramidodinitrophenylic acid and some of its derivatives, **25**, 712.
- Griessmayer, V., assimilation of ammonia by yeast, **25**, 641.
- estimation of beer-extract, **25**, 928.
- use of calcium sulphite in breweries, **25**, 1130.
- behaviour of starch and dextrin to iodine and tannic acid, **25**, 272.
- amount of sugar in hops, **25**, 1111.
- Griffin, C., account of a gas-furnace for chemical operations at a white heat, without the aid of a blowing-machine, **23**, 280.
- J. J., description of an ammonia meter, **3**, 206.
- constitution of aqueous solutions of acids and alkalis, **III**, 155.
- Grimaux, E., aromatic glycols, **25**, 816.
- derivatives of tolylene dichloride, **25**, 136.
- Grimm, F., distillation products of a mixture of butyrate and acetate of calcium, **24**, 385.
- fatty acids contained in Hungarian wine fusel oil, and derivatives of capric acid, **24**, 359.
- Grimm and Gorup-Besanez. See Gorup-Besanez.
- Grothe, G., printing-colours for artificial alizarin, **25**, 188.
- Grotowsky, M., influence of sun-light on petroleum oils, **24**, 1025.
- Grove, W. R., effects of heat on fluids, **16**, 263.
- Grove's experiments on the decomposition of water, observations on the theory of, **III**, 352.
- Groves, C. E., note on the action of chloride of ethyl on ammonia, **13**, 331.
- compounds of iodide and bromide of mercury with the alkaloids, **11**, 97.
- Groves, C. E., and T. Bolas, note on bromopierin, **23**, 153.
- tetrabromide of carbon, **23**, 154, 161.
- Grüne, W., albumin from fish roes, **24**, 968.
- silvering and gilding of silk, **24**, 450.
- waterproofing of linen and cotton cloth, **24**, 767.
- Grüner, L., decomposition of carbonic oxide by the combined action of metallic iron and its oxides, **24**, 798.
- Grünhagen, A., new method of demonstrating and measuring the action of pepsin, **25**, 313.

Grünzweig, C., butyric acid from different sources, **24**, 359.
 Gruner, G., use of quick lime in the blast-furnace mixture, **25**, 850.
 Guckelberger, F., some volatile products of the decomposition of albumin, fibrin, casein, and gelatin by means of peroxide of manganese or chromic acid and sulphuric acid, **1**, 82.
 Günther, estimation of tannin, **24**, 762.
 Güttler, C., gold in arsenical pyrites from Reichenstein in Silesia, **24**, 203.
 Guiarreschi, J., fossil resin from the Val d'Arno Superiore, **25**, 469.
 Guignet, G., action of calcium salts on decoction of cochineal, **25**, 1099.
 Guignet and Cloez. See Cloez.
 Gurlt's process for the manufacture of iron, **10**, 132, 151.
 Gustavson, G., action of carbon tetrachloride on phosphorus pentoxide, **25**, 605.
 — action of phosphoric oxychloride on boric anhydride, **25**, 669.
 — action of phosphorus oxychloride on phosphoric anhydride, **25**, 39.
 — mutual substitution of some metalloids, **25**, 120.
 Guthrie, F., contributions to the history of the amyl-group, **11**, 245.
 — bisulphide of iodine, **14**, 57.
 — iodide of iodammonium, **16**, 239.
 — action of light on chloride of silver, **10**, 74.
 — derivatives from the olefines, **12**, 109; **13**, 35, 129; **14**, 128.
 — sulphoviuates, amylophosphoric acid and the amylophosphates, **9**, 131.
 Gutzkow, F., new method of refining crude silver, **24**, 448.
 — and Brönnner. See Brönnner.
 Guyot, P., estimation of free hydrofluoric acid, **24**, 854.
 — potassic iodochromate, **24**, 801.
 — new facts about selenium, **24**, 660.

H.

Haarmann, action of bromine on acetic aldehyde, **24**, 133.
 Habermann, J., dextronic acid, **25**, 486.
 — and Hlasiwetz. See Hlasiwetz.
 Hadow, E. A., alum in bread, and its detection, **10**, 103.
 — nitroprussides, **19**, 341.
 Hadow, E. A., action of oxidising agents on the sulphocyanides, **11**, 174.
 — composition of the platonic cyanides, **13**, 106.
 — platinum bases; best mode of obtaining and identifying them; some new compounds, **19**, 345.
 — substitution-compounds obtained by the action of nitric acid on cotton, **7**, 201.
 — obituary notice of, **20**, 388.
 Haedicke, H., applications of carbon bisulphide, **24**, 1223.
 Hagemann, E., derivatives of chloral, **25**, 494.
 — formation of propionic acid from carbonic oxide and potassium or sodium ethylate, **25**, 143.
 Hagen, R., malic acid and the changes undergone by its salts at high temperatures, **1**, 28 (p.).
 Hagenbach, E., researches on fluorescence, **25**, 1058.
 — melting of leaden bullets by impact on iron plates, **24**, 798.
 Hager, H., detection of alcohol in chloroform and chloral hydrate, **24**, 163.
 — examination of arsenic, antimony, phosphorus, phosphorous acid, and sulphurous acid, **24**, 759.
 — examination of citric acid for crystals of tartaric acid, **25**, 330.
 — guaiacum resin and iodine reactions, **25**, 1115.
 — detection of piperine, **25**, 330.
 — detection of spirit in essential oils, **25**, 265.
 Hahn, F. G., application of straw to paper-making, **24**, 768.
 — H. C., magnetic pyrites, **24**, 326.
 Haines, R., volatile oils of *Ptychotis Aijwan*, **8**, 289.
 Hamel, F., analysis of potashes, **25**, 1041.
 Hampe, W., leads of the Upper Hartz, **24**, 604.
 Hancock, H. J. B., poison obtained from arrows, **11**, 154.
 Handelin, G., the poisonous principle of ergot-of-rye, **25**, 1102.
 Handl, A., constitution of liquids, **25**, 1071.
 Hanish, H., silvering of gelatin reliefs for galvanoplastic work, **24**, 767.
 Hankel, W. G., pyro-electric properties of topaz, **24**, 669.
 Harcourt, A. Vernon, observation of the course of chemical change, **20**, 460.
 — method for the determination of nitrous and nitric acids, **15**, 381.

- Harcourt, A. Vernon, peroxides of potassium and sodium, **14**, 267.
- Harcourt, W. Venables Vernon, obituary notice of, **25**, 348.
- Hardwick, T. F., acids contained in the oil of *Bassia latifolia*, **2**, 231.
- Hart, F. W., the globe syphon, **25**, 17.
- Harting, M., artificial production of calcareous substances, such as are found in the organism, **24**, 950.
- Hartman, C., aniline oil and aniline black, **25**, 338.
- Hasenclever, R., concentration of sulphuric acid, **25**, 929.
- Hasenclever and Helbig, roasting of sulphuretted ores, **24**, 604.
- roasting of sulphur ores, with a description of a new roasting oven, **24**, 449.
- v. Hauer, C., some salts of cadmium, **8**, 251.
- v. Hauer, K., saponite, **24**, 326.
- Haughton, D., determination of the amount of actual energy developed in the bodies of military vegetarian prisoners engaged at shot-drill, as compared with the amount of muscle consumption, **21**, 43.
- Haughton, S., granites of Scotland compared with those of Donegal, **24**, 208.
- Hausemann, G., internal constitution of gases, **25**, 383.
- Hautefeuille and Troost. See Troost.
- Haüy's table of crystalline forms compared with Leeson's system, III, 535.
- Hayes, S. D., new lead-salt corresponding to cobalt-yellow, **13**, 335.
- Heerer, electrotpe, **25**, 1133.
- Heinrich, R., influence of heat and light on the evolution of oxygen by water-plants, **24**, 1080.
- mineral constituents of wheat-grain, **25**, 516.
- Heintz, E., opium extract and the estimation of opium, **25**, 1129.
- pepsin, **24**, 733.
- W., action of ammonia on α -chloropropionic and β -iodopropionic acid, **24**, 127.
- composition of the amorphous deposit in healthy urine, **15**, 467.
- products of decomposition obtained by boiling chlorethylidene-propionic acid and iodethyle-ne-propionic acid with milk of lime, **24**, 362.
- diethylidene-lactamic acid, **25**, 77.
- Heintz, W., constitution of diglycollic acid, **24**, 361.
- constitution of diglycollic, diglycollamic, and triglycollamic acids, **24**, 236.
- purification of ethylene-lactic acid, **24**, 361.
- composition of human fat, **5**, 84.
- nature of the lactic acid obtained from flesh, **24**, 362.
- new method of separating magnesia from the alkalis, **1**, 185.
- combinations of oxide of lead with ordinary phosphoric acid, **1**, 188.
- combinations of ordinary phosphoric acid with protoxide of manganese, **1**, 388.
- products of the decomposition of stearate of lime, **8**, 308.
- new method of separating substances possessing very similar properties, **5**, 82.
- on Flüciger's water-glass reactions, **24**, 493.
- Heintze, J., chromium compounds, **24**, 890; **25**, 47.
- Heisch, C., quantitative estimation of cyanogen, **2**, 219.
- organic matter in water, **23**, 371.
- Hell and Erlenmeyer. See Erlenmeyer.
- Hellriegel, feeding value of Serradella seed, **25**, 642.
- Henneberg and Fleitmann. See Fleitmann.
- Schulze, Märker, and Busse, change of material in the adult sheep under uniform feeding, **24**, 729.
- Henninger, A., volumetric estimation of zinc, **25**, 843.
- and Vogt. See Vogt.
- Henry, L., chloride of iodine, **24**, 197.
- ether-derivatives of polyatomic alcohols and acids, **24**, 820.
- miscellaneous notes on glycerin derivatives, **24**, 907; **25**, 479, 686.
- synthesis of oxaluric acid, **24**, 823.
- action of phosphorus pentachloride on chloral alcoholate, **24**, 255.
- action of phosphorus pentachloride on chloral-ethyl alcoholate, **24**, 696.
- propargylic alcohol, **25**, 807.
- preparation of propargylic ether, **25**, 480.
- propylene-compounds, **24**, 808.
- Herapath, T. J., quick approximative method of estimating minute quantities of iron by means of a colorimeter, **5**, 27.
- analysis of the ashes of some essential vegetables, **2**, 4.

- Herapath, T. J., analysis of the ashes of the Spanish potato and of the eddoes, **3**, 193.
- cement for stopping the cavities of teeth, **3**, 367.
- analysis of a medicinal water from the neighbourhood of Bristol, **2**, 200.
- composition and distribution of the organic substances in the different organs and component organic parts of the mulberry-tree, **1**, 103.
- chemical composition of pollen, **1**, 1.
- some newly discovered substances from the African guano deposits, **2**, 70.
- analysis of sugar feculencies, **3**, 367.
- analysis of the waters of the Dead Sea, **2**, 336.
- combustion blowpipe for organic analysis, **17**, 49.
- Herapath, W. and T. J., artificial formation of crystalline oxide of zinc, **1**, 42.
- existence of strontia in the well-waters of Bristol, **3**, 193.
- T. J., obituary notice of, **12**, 171.
- W., obituary notice of, **21**, XXIV.
- W. B., polarizing crystals produced by the action of iodine on sulphate of quinine, **5**, 177.
- general characters of the iodosulphates of the cinchona-alkaloids, **11**, 130.
- obituary notice of, **22**, VI.
- Hermann, J. C., ergot, **24**, 724.
- Hermann, L., electromotive force of induction in liquid conductors, **24**, 651.
- Hermann, M., volatile bromine-compound obtained in the technical preparation of bromine, **8**, 256.
- Hermann, R., ilmenium and niobium compounds, **24**, 807.
- researches on the compounds of ilmenium and niobium, and on the composition of niobium minerals, **25**, 294.
- Hermann, W. D., methods for the determination of carbon in steel, **23**, 375.
- Hesse, O., cinchona barks, **25**, 80.
- alkaloids of opium, **23**, 721; **24**, 1064.
- use of polarised light for the valuation of cinchona barks, **24**, 1095.
- quinamine, a new cinchona alkaloid, **25**, 720.
- Hessenberg, F., anhydrite, **24**, 1186.
- gypsum of Wasenweiler, **24**, 1180.
- Heymann, Paul, occurrence of hypoxanthine in normal bone-marrow, **25**, 1106.
- Heynsius, A., and J. Campbell, the oxidation-products of bile-pigments and their absorption-bands, **25**, 307.
- Heys, Z., benzene hexachloride, **24**, 1028.
- Hilgard, W., geology of the delta and the mud-lumps of the Mississippi passes, **24**, 675.
- Hilger, further occurrence of inosite in the vegetable kingdom, and its convertibility into paralactic acid, **25**, 315.
- occurrence of paralbumin in the serous transudates, **25**, 310.
- Himly, estimation of carbonic acid in sea-water, **25**, 455.
- Hindmarch, W. M., obituary notice of, **20**, 391.
- Hirshbrunn and Babo. See Babo.
- Histed, E., occurrence of copper in eajuput oil, **25**, 529.
- Hittorf, allotropy of selenium, **5**, 90.
- Hlasiwetz, H., basicity of gluconic and lactic acids, **24**, 326.
- umbelliferone, **24**, 832.
- Hlasiwetz, H., and T. Habermann, proteides, **24**, 1069.
- Hlasiwetz, H., and P. Weselsky, iodised products of the isomeric acids, $C_7H_6O_3$, **25**, 622.
- Hobson, J. T., new series of organothionic acids, **10**, 55, 243.
- Hoch, H., and H. Kolbe, new derivatives from carbon chloride, **24**, 900.
- Hoch, M., detection and estimation of paraffin in stearin candles, **25**, 526.
- Hodges, J. F., pharmaceutical and chemical characters of the Peruvian matico, **11**, 123.
- Höfer, H., ilsemannite, a native molybdenum salt, **24**, 117.
- the melaphyses of the Little Carpathians, **24**, 321.
- plumbocalcite from Carinthia, **24**, 204.
- rosthornite, a new fossil resin, **24**, 1174.
- Hoehn, H., and E. Reichardt, hyoscyamine, **24**, 149.
- Hoffmann, H., balance between evaporation and precipitation, **25**, 1038.
- lime- and salt-plants, **24**, 1209.
- Hoffmeister, W., phenylic ether and diphenylene oxide, **24**, 123.
- Hofmann, ash-analysis of the cabbage, **24**, 1208.
- A. W., action of acetic acid on phenyl-sulphocyanate, **24**, 140.
- action of acids and bases upon cyaniline, **2**, 300.
- aldehyde green, **24**, 142.

- Hofmann, A. W., amidogen, imidogen, and nitrile-bases, **3**, 96.
- diagnosis of primary, secondary, and tertiary amines, **2, 4**, 141.
- ammonia and its derivatives, **11**, 252; **12**, 62.
- experimental illustration of the composition of ammonia in lectures, **13**, 77.
- how to exhibit the inflammability of ammonia, **13**, 78.
- anilides, **2**, 36.
- aniline, **III**, 26.
- behaviour of aniline and the alcohol bases with nitrous acid, **3**, 231.
- certain processes in which aniline is formed, **II**, 249.
- direct substitution of the alcohol-radicals for the hydrogen in phosphoretted hydrogen, **2, 4**, 407.
- conversion of aniline into toluidine, **25**, 1023.
- aromatic cyanates, **2, 4**, 138.
- synthesis of aromatic monamines by intramolecular atomic interchange, **25**, 1021.
- aromatic phosphines, **25**, 422.
- separation of arsenic from antimony, **13**, 79.
- purification of benzene, **2, 4**, 219.
- action of bisulphide of carbon on amylamine, **13**, 60.
- bisulphide of carbon in coal-gas, **13**, 85.
- biuret and allied compounds, **2, 4**, 396.
- action of bromide and iodide of ethyl on triethylamine, **4**, 304.
- separation of cadmium from copper, **13**, 78.
- chloranil, **II**, 227.
- action of chloride, bromide, and iodide of cyanogen on aniline. Melaniline, a new conjugated alkaloid, **1**, 285.
- spontaneous decomposition of chloride of lime, **13**, 84.
- true composition of chlorindatmit, **II**, 306.
- a reaction of chloroform, **2, 4**, 137.
- formation of the crystalline compound of hydriodic acid and phosphoretted hydrogen, **10**, 210.
- passage of eumic acid through the animal system, **2**, 181.
- deportment of cyanate of ethyl with ethylate of sodium, **13**, 70.
- a new class of cyanic ethers, **2, 4**, 136.
- action of cyanogen on aniline, **2, 4**, 142.
- Hofmann, A. W., action of cyanogen on aniline, toluidine, and cumidine, **1**, 159.
- action of cyanogen on triphenyl guanidine, **2, 4**, 143.
- a reaction of cyanuric acid, **2, 4**, 140.
- dibromide of ethylene, **13**, 67.
- di-iodide of methylene, **13**, 65.
- dinitrotoluic acid, **13**, 72.
- contributions to the history of the ethylene bases, **25**, 500.
- preparation of ethylene bases on a large scale, **2, 4**, 930.
- separation of ethyl-bases by means of oxalic ether, **2, 4**, 262.
- eudiometer with movable spark-wires, **2, 4**, 304.
- formamide, **16**, 72.
- use of gas as fuel in organic analysis, **6**, 209; **11**, 30.
- decomposition of gaseous compounds by electrical incandescence, **12**, 273.
- glycerin, **13**, 71.
- synthesis of guanidine, **19**, 249.
- spontaneous decomposition of gun-cotton, **13**, 76.
- changes of gutta-percha under tropical influences, **13**, 87.
- action of heat on valeric acid, with some remarks on the formulæ of the alcohol-radicals, **2**, 121.
- metamorphoses of indigo; production of organic bases which contain chlorine and bromine, **II**, 266.
- insolinic acid, **9**, 210.
- action of iodine on aniline, **1**, 269.
- isatin, **13**, 73.
- isodicyanic ethers, **2, 4**, 392.
- new mode of forming isonitriles, **2, 4**, 137.
- lecture-experiments: eudiometer with movable spark-wires. Doubling of the volume of carbonic acid during its conversion into carbonic oxide by taking up carbon, **2, 4**, 304.
- lecture illustrations, **18**, 156.
- leucol and chinoline identical, **II**, 384.
- remarks on Liebig's new method of estimating the quantity of urea in urine, **5**, 30, 33.
- melaniline, **1**, 285.
- composition of mesitol, and some of its derivatives, **2**, 104.
- chemical analysis of the mineral waters of Harrogate, **7**, 161.
- nitraniline, a new product of decomposition of dinitrobenzol, **III**, 111.
- nitrophenol, **10**, 203.
- action of nitrous acid on nitrophenylene-diamine, **13**, 51.

- Hofmann, A. W., oxidation-products of the methyl- and ethyl-phosphines, **25**, 420.
- use of pentachloride of antimony in the preparation of chlorine-compounds, **13**, 62.
- phenylic xanthamide, **24**, 267.
- derivatives of phosphine corresponding to ethylamine and diethylamine, **24**, 713.
- action of phosphine on the iodides of methyl and ethyl, **24**, 569.
- primary and secondary phosphines of the methyl series, **24**, 834.
- preparation of pure phosphoretted hydrogen, **24**, 305.
- decomposition of phosphoretted hydrogen by electric sparks, **24**, 306.
- contributions to the history of the phosphorus-bases, **13**, 289; **14**, 73, 316.
- analysis of saline water from Christian Malford, near Chippenham, **13**, 801.
- styrol, and some of the products of its decomposition, **11**, 334.
- compound testing jet, **4**, 39.
- contributions towards the history of thialdine, **10**, 193.
- toluidine, a new organic base, **11**, 367.
- formation of triethylamine, **10**, 208.
- occurrence of triethylamine in herring-brine, **5**, 288.
- volatile organic acids of the mountain-ash berry, **12**, 43.
- molecular constitution of the volatile organic bases, **3**, 279.
- Hofmann and Buckton. See Buckton.
- Hofmann and Cahours. See Cahours.
- Hofmann and Geyger, colouring matters derived from the aromatic azo-diamines. Safranine, **25**, 695, 826.
- Hofmann and Graham. See Graham.
- Hofmann, Graham, and Miller. See Graham.
- Hofmann, Graham, and Redwood. See Graham.
- Hofmann and Martius, methylation of the phenyl group in aniline, **24**, 1060.
- Hofmann, F., the storing of fat in the animal organism, **25**, 1031.
- Hofmann, P. W., azobenzol and ben-zidine, **14**, 60.
- Hofmeister, formation of hippuric acid in the urine of herbivora, **25**, 835.
- Holmes and Gladstone. See Gladstone.
- Hoppe-Seyler, F., composition of the blood in chyluria, **24**, 740.
- the ferment which effects the conversion of cane-sugar into grape- and fruit-sugar, **25**, 317.
- occurrence of gelatinous tissues in *Invertebrata*, **24**, 849.
- guanine in the urine of the heron (*Ardea cinerea*), **24**, 848.
- hæmatin, **24**, 736.
- formation of lactic acid from sugar without fermentation, **24**, 546.
- presence of phenol in the animal body and its action on the blood and nerves, **25**, 628.
- chemical composition of pus, **24**, 744.
- putrefactive processes and disinfection, **24**, 843.
- production of pyrocatechin from carbohydrates, **24**, 849.
- formation of pyrocatechin from cellulose and other carbohydrates, **24**, 226.
- urinary calculi, **24**, 848.
- urine of *Pseudopus serpentinus*, **24**, 848.
- Horner, C., didymium in pyromorphite, **25**, 995.
- the spectra of manganese in blowpipe beads, **25**, 524.
- Horsin-Déon, compounds of sugar with lime, **25**, 810.
- Horstmann, A., theory of dissociation, **24**, 880.
- Houzeau, A., electrification of air and oxygen for the production of ozone, **24**, 994.
- an azotimeter, **25**, 322.
- facts for the history of nitrification. Composition of the soil of Tantai, Lower Egypt, **25**, 465.
- researches on oxygen in the nascent state, **8**, 237.
- atmospheric ozone, **25**, 976.
- preparation of ozone in a concentrated state, **25**, 220.
- proportion of ozone contained in the air of the country, and its origin, **25**, 465.
- dense brine from salt-springs, Nova Scotia, **18**, 46.
- acid feed-water from the coal-field at Stellarton, Nova Scotia, and the results of its use, **23**, 155.
- meconic acid and its derivatives, **6**, 72.
- mordenite, a new mineral from the trap of Nova Scotia, **17**, 100.
- decomposition of nitrate of lime in contact with putrefying curd, **5**, 1.

- How, H., analysis of an ancient Peruvian alloy, **III**, 252.
- pickeringite occurring in slate in Nova Scotia, and the class of salts to which it belongs, **16**, 200.
- note on platinum accompanying silver in solution of nitric acid, **7**, 18.
- basic products, obtained by the decomposition of vegetable alkaloids, **6**, 125.
- certain salts and products of decomposition of comenic acid, **4**, 363.
- water from the coal-measures, at Westville, Nova Scotia, **24**, 176.
- winkworthite, **24**, 320.
- How, H., and T. H. Rowney, analysis of the ash of the orange-tree, **III**, 370.
- Howard, D., new alkaloid from cinchona-bark, **24**, 61.
- contribution towards the history of cinnamic acid, **13**, 135.
- quinine and cinchonine, **25**, 101.
- Howard, Robert, obituary notice of, **25**, 349.
- Hudson, F., obituary notice of, **20**, 392.
- Hübner, H., isomerism of aromatic acids, **24**, 363.
- bromo-sulphotoluenes, **24**, 1056.
- determination of the relative positions of the substituted radicals in aromatic compounds, **24**, 824.
- formation of salicylic acid from the bromobenzoic acid melting at 155° , **25**, 403, 624.
- sulphotoluene derived from bromo-sulphotoluene, **24**, 120.
- Hübner, H., and G. Heinzerling, on the nature of some bromosalicylic acids, **25**, 894.
- Hübner, H., and P. Jannasch. See Jannasch.
- Hübner, H., and V. Müller, transformation of dichlorhydrin boiling at 174° into that which boils at 182° , **25**, 999.
- relations between glycerin and allyl compounds, **24**, 906.
- Hübner, H., and Post. See Post.
- Hübner, H., and G. Reitsch, bromotoluenes, **25**, 696.
- Hübner, H., and M. Schneider, dinitrophenols, **25**, 483.
- Hübner, H., and G. Schreiber, molecular weights of fumaric and maleic acids, **25**, 891.
- Hübner, H., and N. M. Terry, α -bromosulphotoluene and α -sulphotoluene, **25**, 1005.
- Hüfner, G., unorganised ferments, **25**, 903.
- Hüfner, G., estimation of urea by means of sodium hypobromite, **24**, 162.
- Huggins, W., note on the spectrum of Encke's comet, **25**, 383.
- spectrum of Uranus and spectrum of comet I, 1871, **24**, 885.
- Humann, E., butylic mercaptan and butylic urethane, **8**, 274.
- Hunt, R., actino-chemistry, **II**, 311.
- Hunt, T. Sterry, oil-bearing limestone of Chicago, **24**, 674.
- Hunt, W., preparation of potassium chlorate, **25**, 1075.
- Hunter, J., analysis of deep-sea-water, **23**, 144.
- results of the analysis of sea-water performed on board H.M.S. "Porcupine," **23**, 16.
- effects of pressure on the absorption of gases by charcoal, **24**, 76.
- absorption of vapours by charcoal, **18**, 285; **20**, 160; **21**, 186.
- absorption of mixed vapours by charcoal, **23**, 73.
- Huppert, H., behaviour of monochloro-acetic acid to methylguanidine and similar compounds, **25**, 149.
- Huppert, H., and J. Dogiel, biuret, **24**, 716.
- Hurschberg, R., prevention of injury from the presence of lime in brick-clay, **24**, 765.
- Hurst, W. G., notes on the sulphur-compound formed by the action of sulphuretted hydrogen on formate of lead at a high temperature, **15**, 278.
- Husemann, Th., antidotes to poisoning by phenol, **25**, 638.
- Hustler, W., obituary notice of, **25**, 350.
- Hutchings, L., compound obtained by the action of fuming sulphuric acid on chloride of phenyl, **10**, 102.
- Hutchinson, J., specific heat and conducting power of building materials, **1**, 24 (p).

I.

Irelan, ethylic sulphocyanate, **21**, 193.

J.

Jacobi, J., separation and utilisation of phosphoric acid in iron ores, **24**, 1210; **25**, 931.

Jacobsen, O., chloro-substitution products of ethyl oxide, **24**, 513.

— combination of chloral with alcohols and amides, **24**, 257.

Jacobsen, O., flesh-juice of *Phocæna communis*, **24**, 426.
 — Indian geranium oil, **24**, 261.
 — examination of a very compact Swedish peat, **24**, 211.
 Jacobsen, O., and A. Emmerling, synthetical researches on the ureids, **25**, 249.
 Jacot, A., the industrial out-turn of a layer of potassium chloride at Kalutz in Galicia, **25**, 336.
 Jaffé, Max., biliary and urinary pigments, **24**, 419.
 Jagno, G., new water air-pump, **25**, 1067.
 Janin and Richard, rate of cooling of gases, **25**, 972.
 Jani, W., titration of phosphoric acid by uranium solution, **24**, 753.
 — method of working up uranium residues, **24**, 586.
 Jannasch, P., nature of the coal-tar products boiling between 161° and 169°, **25**, 241.
 — cumidic acid, **24**, 240.
 — a crystalline xylene, **24**, 569.
 Jannasch, P., and H. Hubner, ortho-xylene, **25**, 893.
 Jannasch, P., and H. Süssenguth, dibromopseudocumene, **25**, 240.
 Janssen, J., spectrum of the solar corona, **25**, 590.
 — spectrum of the vapour of water, **25**, 280.
 Jarisch, A., inorganic constituents of the blood, **25**, 831.
 Jazukowitsch, N., a product of the decomposition of chloromethylsulphurous acid, **25**, 997.
 Jean, F., estimation of glucose, **25**, 179.
 — sodium sulphide as a blowpipe reagent, **25**, 524.
 Jeannel, D., gas thermo-regulator for high temperatures, **25**, 667.
 Jehn, C., action of mercuric oxide on iodide of potassium, **25**, 987.
 v. Jeremejew, P., diamonds in xanthophyllite, **24**, 667.
 Jermolowew and Menschutkin. See Menschutkin.
 Jicinsky, F., effect of certain methods of boiling in the vacuum-pan of a sugar factory, **25**, 1136.
 Johnson, M. W., action of ammonia on bioxysulphocarbonate of amyl, **5**, 142.
 — simple aspirator, **4**, 186.
 — obituary notice of, **16**, 435.
 — analysis of sediment deposited from the River Nile, in Lower Egypt, **4**, 112.

Johnson, P. N., obituary notice of, **20**, 392.
 Johnson, R., and F. C. Calvert. See Calvert.
 Johnston, J. F. W., sugar of the Eucalyptus, **1**, 859.
 — obituary notice of, **9**, 157.
 Jones, H. Bence, decomposition of salts of ammonia at ordinary temperatures, **11**, 244.
 — simultaneous variations of hippuric and uric acid in healthy urine, **15**, 81.
 — occurrence of crystallised phosphate of lime in human urine, **15**, 8.
 — sugar in the urine, **14**, 22.
 — composition of the amorphous deposit of urates in healthy urine, **15**, 201.
 — deposit of crystallised xanthine in human urine, **15**, 78.
 — solubility of xanthine (uric oxide) in dilute hydrochloric acid, **21**, 211.
 Jones, R., superphosphate, **25**, 268.
 Jorgensen, S. M., periodides of the alkaloïds, **24**, 398, 929.
 Joule, J. P., amalgams, **16**, 378.
 — effects of cold on iron and steel, **24**, 445.
 — mechanical equivalent of heat, **3**, 316.
 Joule, J. P. and L. Playfair, researches on atomic volume and specific gravity, **11**, 401; **111**, 57, 199; **1**, 121.
 Joy, C. A., selenide of ethyl or selen-ethyl, **7**, 93.
 Judson, W. E., trichloroacetic and trichlorocrotonic acids, **24**, 232.
 Julin's chloride of carbon, **20**, 443.
 Jungfleisch and Berthelot. See Berthelot.

K.

Kachler, J., blue chamomile oil, **24**, 258.
 — researches on compounds belonging to the camphor group, **24**, 560, 1048; **25**, 496, 1010.
 Kämmerer, H., employment of bromine instead of chlorine for analytical purposes, **24**, 581.
 — organic derivatives of sulphuric acid, **24**, 552.
 Karsten, H., influence of light on the germination of the kidney-bean, **25**, 168.
 — a simple quicksilver lute, **25**, 528.
 Kay, G., some new derivatives of chloroform, **7**, 224.

- Keightley and Page. See Page.
- Kekulé, A., on some condensation-products of aldehyde, and on the constitution of benzene, **25**, 612.
- butylene glycol, a new condensation-product of aldehyde, **25**, 397.
- observations on the "first runnings" from the alcohol manufacture, **24**, 1187.
- action of hydrobromic and hydriodic acids on polyatomic acids, and behaviour of iodo-substitution compounds towards hydriodic acid, **17**, 203.
- new series of sulphuretted acids, **7**, 188.
- Kekulé, A., and W. Dittmar, on an aromatic glycollic acid, **24**, 375.
- Kekulé, A., and T. E. Thorpe, ethylbenzoic acid, **22**, 366.
- Kekulé, A., and Th. Zincke, the so-called chloracetene, and the polymeric modifications of the aldehydes, **25**, 491.
- Keller, F., method of obtaining metacetic acid in large quantities, **3**, 190.
- Kemper, R., Kamala, **25**, 1034.
- Kempfer, T., action of liquid phosgene on some organic compounds, **24**, 341.
- Kempe, T., and H. Kolbe, products of the electrolysis of potassium acetate, **24**, 916.
- Kengott, A., the chlorite family, **24**, 206.
- composition of epidote, **24**, 1172.
- hydrated sodium chloride from Etna, **24**, 1173.
- nephrite (Punamu) of New Zealand, **24**, 673.
- sal-ammoniac from Vesuvius, **24**, 1016.
- sandbergerite, **24**, 327.
- Kerl and Claus. See Claus, **25**.
- Kerner, G., alteration of the white blood-corpuscles by quinine, **25**, 251.
- Kessler, F., estimation of manganese in iron and steel, **25**, 925.
- estimation of phosphorus in crude pig-iron, **24**, 159.
- Kessler, L., modification of Dumas' method for the estimation of nitrogen, **25**, 526.
- Kielmeyer, Dr., black lustre colour for sugar-paper, **24**, 170.
- Kimptzel and Montefiori-Levy. See Montefiori-Levy.
- Kirchoff and Bunsen. See Bunsen.
- Kirpitschon, M., determination of copper in brass by titration, **24**, 758.
- Klaye, A., and A. Deuss, separation of zinc from nickel, **24**, 955.
- Knab, O., preservation of beer for transport by sea, **25**, 1142.
- Knapp, F., origin of the hydraulic powers of mortars and cements, **25**, 528.
- Knop, A., chromate of copper and potassium, **3**, 73.
- substances crystallised from microcosmic salt and from borax, **24**, 802.
- crystallisation of titanio acid, **24**, 200.
- Knop, W., physiological chemistry of lichens, **25**, 639.
- analysis of Nile mud, **25**, 644.
- v. Kobell, F., the amblygonite of Montebello, **25**, 468.
- bismuthite from St. José, in Brazil, **25**, 130.
- gümbelinite, **24**, 325.
- behaviour of lithium minerals before the spectroscope, and occurrence of thallium in sphalerite, **24**, 312.
- marceline. Constitution of silica, **25**, 127.
- monzonite, a new mineral species, **24**, 1178.
- abnormal crystals of sodium chloride, **24**, 1178.
- Koch, R., detection of curarine, **24**, 600.
- Koelle, R., dimethyl- and diethylprotocatechuic acid, **24**, 829.
- sulphoparaoxybenzoic acid, **25**, 1018.
- Kohlfürst, L., improved copper-zinc battery, **24**, 480.
- Kohlrausch, F., spectroscopic phenomena produced by dispersion, **24**, 798.
- Kohn, F., alloys of iron and manganese, **24**, 169.
- Kolbe, H., electrolysis of acetic acid, **21**, 195.
- prognosis of new alcohols and aldehydes, **19**, 51.
- formation of benzoyl hydride, **9**, 266.
- rational formula of chlorocitramalic acid, **25**, 145.
- conjugate compounds, **11**, 360.
- chemical contributions by, **21**, 192.
- constitution of diglycollic, diglycollamic, and triglycollamic acids, **24**, 237.
- researches on the electrolysis of organic compounds, **2**, 157.
- reducing action of the hydrogen absorbed by palladium, **25**, 231.
- constitution of lactic acid, **12**, 15.
- preparation of pure manganous chloride, **25**, 1078.
- chemical constitution of metacetic acid, and some other bodies related to it, **11**, 386.

- Kolbe, H., decomposition of soluble metallic sulphides by water, **25**, 224.
 — conversion of mono-carbon acids into the corresponding more highly carbonised di-carbon acids, **17**, 109.
 — formation of nitric acid in eudiometric combustions of gases mixed with nitrogen, **III**, 245.
 — nitrocarbol, **25**, 997.
 — chemical constitution and nature of organic radicals, **3**, 369; **4**, 41.
 — oxidising power of oxygen when disengaged by means of voltaic electricity, **III**, 288.
 — structural formulæ, and the theory of the linking of atoms, **24**, 331.
 — reduction of sulphuric acid to hydrogen sulphide by hydrogen in the nascent state, **25**, 786.
 — chemical composition and artificial formation of taurine, **15**, 94.
 — decomposition of valerianic acid by the voltaic current, **III**, 378.
 — critical observations on Williamson's theory of water, ethers, and acids, **7**, 111.
 Kolbe's additive formulæ, remarks on, by A. W. Williamson, **7**, 122.
 Kolbe and Frankland. See Frankland.
 Kolbe and Hoch. See Hoch.
 Kolbe and Kempt. See Kempt.
 Kolbe and Wirchin, preliminary notice on phthalic aldehyde, **19**, 339.
 Kollarits, M., and V. Merz, synthesis of diphenyl ketone, **25**, 707.
 König, J., influence of an ammonium salt in the precipitation of phosphoric acid by ammonium molybdate, **25**, 264.
 — estimation of reduced phosphates, **25**, 842.
 — elementary composition of vegetable fats, and amount of digestible fat in fodder, **24**, 1201.
 König and Dietrich. See Dietrich.
 de Koninck, L., and P. Marquart, correction to a note on bryonicin, **25**, 131.
 — — action of phosphorus pentachloride on nitronaphthalene, **25**, 301.
 Koosen, J. H., use of permanganate in the galvanic battery, **25**, 279.
 Kopp, E., paraphenolsulphonic acid, **25**, 622.
 — process for distinguishing and separating silk, wool, and vegetable fibres in mixed tissues, **25**, 1144.
 Kopp, H., relations between chemical composition, boiling points, and specific volumes, **3**, 104.
 Kopp, H., investigations of the specific heat of solid bodies, **19**, 154.
 Kosmann, B., iridescent laminae in hypersthene, **24**, 1174.
 Kosmann, C., analytical researches on rocks, **24**, 429.
 — comparison of the working of the ordinary puddling furnace, and the Siemens's regenerative furnace, **24**, 446.
 Krämer, action of chlorine upon aldehyde, **24**, 253.
 Krämer and Bannow. See Bannow.
 Krämer and Pinner, action of chlorine on aldehyde, **24**, 556.
 Krall and Claus. See Claus.
 Krapp, K., estimation of carbonic acid in well-water, **24**, 582.
 Kraus, Carl, behaviour of iodine with acids, **25**, 1073.
 Kraut, K., acetopiperidine-compounds, **24**, 147.
 — cuminic alcohol, **8**, 166.
 — decomposition of phosphorus trichloride by water, **24**, 660.
 — saliretin, **24**, 540.
 — action of salts on alcohol, **24**, 346.
 Kraut, K., and O. Popp, potassium-amalgam and sodium-amalgam, **24**, 890.
 Krecke, F. W., reactions of manganous chloride, **25**, 1077.
 — relations between the optical rotatory powers of organic bodies, **25**, 665.
 Kretschmer and Liebermann. See Liebermann.
 Kreusler and Ritthausen. See Ritthausen.
 Krippendorff, silvering of glass, **24**, 859.
 Kriwaxin, W., on the so-called dichloracetone, **24**, 1027.
 — decomposition of ethylene bromide by water, **24**, 1027.
 — structure of ethylene, **24**, 1027.
 Krock, J. M., derivatives of luteo- and roseo-cobaltic iodosulphate, **24**, 1169.
 Krötke, C., manufacture of starch-syrup and starch-sugar, **24**, 458.
 — manufacture of starch-sugar free from gum, for the preparation of spirit-colouring, **25**, 937.
 — preparation of sugar-colours for beer, &c., from potato-starch sugar, **25**, 938.
 Kruke, F. W., dissociation in aqueous solutions of ferric chloride, **24**, 662.
 Kühn, G., influence of food on the production of milk in the cow, **24**, 414.
 Kuhlmann, chalk hardened by his

- process for the silicification of limestones, **1**, **11** (p).
- Kuhlmann, presence of selenium in sulphuric acid of French manufacture, **25**, 596.
- Kuhlberg and Beilstein. See Beilstein.
- Kuhr, A., waterproofing of linen, **24**, 767.
- Kundt, A., anomalous dispersion, **24**, 884; **25**, 383.
- absorption-spectrum of liquid nitrogen tetroxide, **24**, 185.
- Kurbatow, A., oilbanum, **24**, 695.
- Kurtz, C. M., derivatives of butyrene, **25**, 410.
- Kurtz, M., tartaric acid making, **25**, 187.
- Kynaston, J. W., composition and analysis of black ash or ball soda, **11**, 155.
- process for the quantitative estimation of sulphides, sulphites, hyposulphites, and sulphates in presence of each other, as adopted in the determination of these salts in "soda waste," as obtained from black ash, **11**, 166.
- analysis of the water of a spring at Billingborough, Lincolnshire, **12**, 57.
- L.**
- Laborde, l'Abbé, new facts concerning the communication of heat, **24**, 1128.
- action of oxygen on vegetable infusions, **25**, 640.
- Ladenburg, A., constitution of benzene, **25**, 619.
- reduction-products of silicic ether, **24**, 1037; **25**, 806.
- nature of silicium compounds occurring in plants, **25**, 910.
- the silicoheptyl series, **25**, 156, 609.
- stannic phenyltriethide, **24**, 225.
- reactions of stannic triethide, **24**, 223.
- Ladenburg and Friedel. See Friedel.
- de Laire and Girard. See Girard.
- de Lalaunde and Prud'homme, commercial manufacture of chlorine, **25**, 846.
- Lamy, presence of selenium in sulphuric acid of French manufacture, **25**, 596.
- Landauer, J., application of sulphuretted hydrogen reactions to analyses in the dry way, **25**, 841.
- Landolph, F., cymene derivatives, **25**, 473.
- Landolt, H., arsenides of ethyl, or arsenethyls, **7**, 258.
- bromine-water as a test for phenol and allied substances, **24**, 1216.
- simplest method of ascertaining the molecular weight by the vapour-volume, **25**, 782.
- Landrin, E., reciprocal action of acids and alkalis in solution when separated by a porous diaphragm, **25**, 460.
- v. Lang, V., anomalous dispersion of acute-angled prisms, **24**, 884.
- crystalline form of some products obtained from narcotine, **21**, 365.
- optical properties of ethylene-diamine sulphate, **25**, 626.
- Laakester, E. R., presence of hæmoglobin in the muscles of mollusca, and its distribution in the living organism, **25**, 255.
- Langlois and Saint-Pierre, spontaneous decomposition of potassium bisulphite, **24**, 1167.
- v. Lasaulx, A., blende crystals from Unkel, **25**, 130.
- contributions to micromineralogy, **25**, 294.
- Latschinow and Engelhardt. See Engelhardt.
- Laurent, A., obituary notice of, **7**, 149.
- Laurent and Gerhardt. See Gerhardt.
- Lauth, C., manufacture of aniline colours, **25**, 1046.
- Lawes, J. B., and J. H. Gilbert, effects of the drought of 1870 on some of the experimental crops at Rothamsted, **24**, 430.
- nitrogen supplied to the soil in manure, and not recovered in the increase of crop, **24**, 577.
- composition, value, and utilisation of town sewage, **19**, 80.
- on some points in the composition of wheat-grain, its products in the mill, and bread, **10**, 1, 269.
- Lawes, Gilbert, and Pugh, sources of the nitrogen of vegetation, with special reference to the question whether plants assimilate free or uncombined nitrogen, **16**, 100.
- Lawrence, action of acetic anhydride on stannic oxide, **25**, 813.
- Lawrow, H., crystallised platinum chloride, **25**, 600.
- Le Bel, petroleum of the Bas-Rhin, **24**, 1025.
- Leblanc, F., report on a proposed modification of Bunsen's battery, **25**, 664.
- observations on the two-liquid battery, and on the modifications

- which may give rise to variations in the energy of Bunsen's battery, **25**, 664.
- Le Blanc, F., voltaic energy of two-liquid batteries, **24**, 1133.
- Lebourdais, M., vegetable principles, **1**, 413.
- Lecoq de Boisbaudran, preparation of cesium and rubidium salts from lepidolite, **25**, 880.
- mutual convertibility of dextro- and lævo-tartaric acid, **25**, 1094.
- separation and estimation of several metals by the voltaic current, **25**, 174.
- on some points in spectrum analysis, and on the constitution of induction-sparks, **25**, 117.
- Lee, R. H., atomic weights of cobalt and nickel, **24**, 1006.
- Leeson, H. B., circular polarization of light by transmission through fluids, **11**, 26.
- on crystallography, with a new goniometer and crystallonome, **111**, 486.
- preparation of fluoride of iodine, **11**, 162.
- isomorphism, &c., and a simple law governing all crystalline forms, **2**, 148.
- Lefort, J., distribution of atropine in the leaves and roots of the deadly nightshade, **25**, 908, 1101.
- changes in the quality of well-waters arising from their proximity to cemeteries, **25**, 183.
- Lechartier, G., and F. Bellamy, fermentation of fruit, **24**, 836.
- Lehmann, C. G., obituary notice of, **16**, 433.
- Lehmann's process for the detection of sugar in urine, **14**, 23.
- Leist, A., bismuth sulphates, **25**, 14.
- Lemoine, G., reciprocal transformation of the two allotropic states of phosphorus, **24**, 1157.
- v. Lenk's process for the manufacture of gun-cotton, **20**, 317.
- van Lennep, J. R., bromosulphobenzoic acid and its derivatives, **24**, 369.
- Lennox, A. E. W., bromide of carbon, **14**, 205.
- Lepetit and Frapolli. See Frapolli.
- Lermontoff, J., diphenine, **25**, 503.
- Letheby, H., production of a blue substance by the electrolysis of sulphate of aniline, **15**, 161.
- Letts, E. A., new method of preparing amides and nitriles, **25**, 1020.
- benzyl isocyanate and isocyanurate, **25**, 446.
- Letts, E. A., composition of the hyposulphites, **25**, 424.
- a compound of sodium and glycerin, **25**, 450.
- Leube, G., testing crude carbolic acid, **25**, 266.
- Leuchs, C., relation between the specific gravity of indigo and the amount of colouring matter present, **25**, 251.
- Leygue, L., and P. Champion, temperatures of inflammation and detonation of explosive compounds, **25**, 185.
- L'Hôte, L., method of determining the gases resulting from the explosion of nitroglycerin, **24**, 1219.
- Liborins, P., quantitative estimation of egg albumin, **25**, 814.
- Lieben, A., action of chlorine on absolute alcohol, **24**, 345.
- Lieben, A., and A. Rossi, normal amyl alcohol and normal caproic acid, **24**, 1033.
- normal butyl alcohol, **24**, 516.
- conversion of formic acid into methyl alcohol, **24**, 343.
- normal valeric acid, **24**, 1043.
- Liebermann, C., bye-product in the manufacture of alizarin, **24**, 535.
- note on Böttger and Petersen's communication on nitrogen-compounds of anthraquinone, **24**, 533.
- chrysene, **24**, 692.
- naphthazarin, **24**, 355.
- new mode of decomposition of rosaniline, **25**, 419.
- Liebermann, C., and L. Chojnaeki, action of sulphuric acid on opianic acid, **24**, 379.
- Lieberman, C., and W. A. van Dorp, colouring matter of cochineal, **24**, 912; **25**, 706.
- Liebermann, C., and C. Graebe. See Graebe.
- Liebermann, C., and O. Kretschmer, propargylic ether, **24**, 527.
- v. Liebig, H., soil statics and soil analyses, **25**, 318, 837.
- v. Liebig, J., separation of some of the acids of the series $(\text{CH})_n\text{O}_4$, **3**, 82.
- means of removing the acid from stored wines, **1**, 413.
- researches in animal chemistry, **111**, 290.
- atomic weight of carbon, **1**, 9.
- preparation of cyanide of potassium and its applications, **1**, 94.
- formation of fat in the animal body, **1**, 164.
- fibrin of muscular flesh, **3**, 188.
- process for determining the amount of hydrocyanic acid in medicinal prussic

- acid, bitter almond water, and laurel water, **4**, 219.
- v. Liebig, J., kynurenic acid, **6**, 113.
- mellonides, **8**, 259.
- separation of nickel from cobalt, **1**, 187.
- determination of the proportion of oxygen in atmospheric air, **4**, 221.
- silkworm disease, **2**, 435.
- extract of a letter from, to Dr. Daubeny, on some properties of soils, **11**, 53.
- note on thierschite, **6**, 112.
- effect of time in the production of chemical compounds, **1**, 397.
- some compounds of urea and a method for the determination of chloride of sodium and urea in urine, **6**, 1.
- method for estimating the quantity of urea in urine, **5**, 30.
- preparation and formation of yellow prussiate of potash, **1**, 2 (p).
- v. Liebig, and Redtenbacher, carbosialdine, **1**, 81.
- Liesing, F., mode of estimating the value of red prussiate of potash, **6**, 31.
- Lightfoot, J., aniline black, **25**, 854.
- v. Lill, M., ullmannite from the Rinkenbergr in Carinthia, **2**, 1179.
- Limousin, preparation and purgative properties of sodium sulphovinate, **25**, 853.
- Limpriecht, H., caprylic aldehyde, **8**, 155.
- chemical notices, **9**, 184, 264.
- easy method of preparing chloride of ethylene, **8**, 157.
- compounds of the ketones with alkaline bisulphites, **8**, 154.
- preparation of leucine from the aldehyde of valerianic acid, **8**, 157.
- metaldehyde of valerianic acid, **8**, 157.
- Limpriecht, H., and K. Schwanert, benzoin, **2**, 536.
- — — toluylene, isotoluylene, and stilbene alcohols, **25**, 137.
- Limpriecht, H., and L. von Uslar, formation of nitride of benzoyl from hippuric acid, **7**, 191.
- Lincke, R., variegated sandstone of the eastern rim of the Thuringian basin, **2**, 209.
- Lindroth, K., crystallisation of sodium hydrate, **25**, 597.
- Linnemann, E., acryl compounds, **25**, 1002.
- derivatives of acrylic acid, **25**, 689.
- constitution of allyl alcohol, **25**, 133.
- differences of boiling point in homologous series, **25**, 470.
- conversion of normal butyl alcohol into butylene hydrate or ethyl-methyl carbinol, **25**, 474.
- Linnemann, E., synthesis of normal butyl alcohol, **25**, 394.
- pure normal butyl derivatives, **25**, 396.
- an important improvement in the method of fractional distillation, **25**, 229.
- inverse formation in the tetryl series, **25**, 478.
- conversion of isobutyl alcohol into trimethyl carbinol, **25**, 475.
- inverse formation of isobutyl alcohol from trimethyl carbinol, **25**, 478.
- pure normal propyl compounds, **25**, 235.
- synthesis of normal propyl alcohol, **25**, 234.
- conversion of normal propyl alcohol into isopropyl alcohol, **25**, 236.
- Linnemann, E., and V. v. Zotta, conversion of acetone into lactic acid, **2**, 919.
- — — conversion of normal butyl alcohol into isobutyl alcohol, **25**, 474.
- — — synthesis of normal butyric acid, **25**, 402.
- — — reduction of formic acid to formaldehyde and methyl alcohol, **25**, 234.
- — — reduction of isobutyric acid to isobutyl alcohol, **25**, 475.
- Lippmann, E., phenyllic ethers, **2**, 1040.
- Lippmann and Sperlich. See Sperlich.
- Loebisch, O., cholesterin, **25**, 807.
- Loew, O., a new derivative of albumin, **25**, 1028.
- derivatives of albumin, **2**, 409.
- electrocapillary (chemosmotic) phenomena, **2**, 1140.
- Löwe, J., solutions of the compounds of glycerin with copper (or bismuth) oxide in caustic soda, **25**, 329.
- apparatus for estimating the melting point of organic bodies, **2**, 973.
- Löwel, H., supersaturation of saline solutions, **3**, 164.
- Löwenthal, J., liquid transpiration, and its use in scientific and technical chemistry, **25**, 219.
- Löwig, K., plumbides of ethyl, or plumbethyls, **7**, 268.
- stibethylum compounds, **8**, 260.
- Lommel, E., behaviour of chlorophyll to light, **25**, 158.
- fluorescence, **2**, 798.
- coloured gelatin-films as objects for the spectroscopy, **25**, 118.
- Long, C. E., crystallised sodium and potassium, **13**, 122.

Longuinine, action of sodium on the two isomeric monobromotoluenes, **24**, 684.
 Longuinine and Berthelot. See Berthelot.
 Losanitsch, S. M., chlorinated and iodated phenylic mustard oil, **25**, 510.
 — tetranitrodiphenyl, **24**, 509.
 Lossen, W., the benzoyl-derivatives of hydroxylamine, **25**, 414.
 — hydrochlorides of hydroxylamine, **25**, 37.
 Lossen, W., and P. Schifferdecker, isuretine, a base isomeric with urea, **25**, 500.
 Lothar-Meyer, isomorphism of sodic nitrate with calespar, **24**, 197.
 Loughlin, J. E., metallic manganese, **25**, 1077.
 Louvel, preservation of grain in a vacuum, **25**, 320.
 Lubavin, N., artificial digestion of casein by pepsin, and action of water on albuminous substances, **24**, 731.
 de Luca, S., a complex alum obtained from the hot mineral water of the Solfatara of Puzzuoli, **25**, 226.
 — composition of the gases evolved from the mouths of the Solfatara of Puzzuoli, **25**, 294.
 Lucius, E., solidifying point of aniline, **25**, 502.
 Luck, E., manganese analysis by the method of Fresenius and Will, **25**, 264.
 Ludwig, E., contributions to gas analysis, **25**, 918.
 — action of chromic acid on carbonic oxide, hydrogen, marsh-gas, and ethylene, **25**, 590.
 — meteoric iron from the desert of Atacama, **24**, 1180.
 — quinone-derivatives of naphthol, **25**, 241.
 — the alkaloïds of the Papaveraceæ, **25**, 1028.
 — the chromogen of *Boletus cyanescens* and other fungi that become blue after fresh fracture, **25**, 424.
 — density of elements compared with that of their oxides, **24**, 798.
 — examination of flour, **24**, 858.
 Ludwig, E., and H. Müller, a chromogluco-side from the seed of *Melampyrum arvense*, **25**, 424.
 — constituents of the rhizomes of *Triticum repens*, **25**, 840.
 Lukanin, Adelaide, succinyl-benzoin, **25**, 1094.
 de Luna, Ramon, action of cupric sulphate on normal urine, **25**, 1033.
 Lunge, G., fabrication of caustic baryta and sulphide of barium, **25**, 187.

Lunge, G., determination of available chlorine in bleaching powder, **24**, 858.
 — recovery of nitrous acid in the manufacture of sulphuric acid, **24**, 1100.
 — recovery of sugar from molasses by baryta, **25**, 185.
 Lwow, M., quintanes, **24**, 1026.

M.

Macadam, S., general distribution of iodine, **6**, 166.
 Macalpaine and Fittig. See Fittig.
 Macfarlane, J. F., obituary notice of, **14**, 349.
 MacLagan, D., conversion of cane-sugar into a substance isomeric with cellulose and inulin, **11**, 384.
 Mactear, J., notes on the loss of soda in Leblanc's process, **25**, 335.
 Maevicar, J. G., notices of two new maximum and minimum mercurial thermometers, **10**, 221; **11**, 106.
 Madan, H. G., remarks on some points in the nomenclature of salts, **23**, 22.
 Maddrell, R., metaphosphates, **11**, 273.
 Mäcker, Max., crude ammonia, **25**, 918.
 — estimation of ammonia in presence of soluble phosphates by means of calcined magnesia, **25**, 89.
 — assimilation of meadow-hay by sheep, **24**, 1074.
 Magnus's gas apparatus for organic analysis, **7**, 250.
 Magnus, H. G., obituary notice of, **24**, 610.
 Maisch, J. M., amyl nitrite, **25**, 1092.
 — decomposition of morphine acetate in solution, **24**, 148.
 — detection of turmeric in powdered rhubarb and yellow mustard, **24**, 761.
 Makins, G. H., improved assay-balance, **6**, 36.
 — relative expansions of mixtures of alcohol and water under the influence of a certain rise of temperature, and a new instrument for taking the specific gravities of the same, **2**, 224.
 — certain sources of loss of precious metals in some operations of assaying, **13**, 97.
 Malaguti, Durocher, and Sarzeand. See Durocher.
 Mallet, J. W., the fusion of metallic arsenic, **25**, 1075.
 — fichtelite in recent pine timber, **25**, 1083.

- Mallett, J. W., gases occluded in meteoric iron from Augusta Co., Virginia, **25**, 797.
- three masses of meteoric iron, **24**, 1020.
- observations on tellurethyl, or telluride of ethyl, **3**, 71.
- Maly, R., the bile-pigments, **25**, 638.
- conversion of bilirubin into urinary colouring matter, **25**, 514, 835.
- preparation of creatinine hydrochloride from urine, **24**, 942.
- changes which oxybenzoic and par-oxybenzoic acids undergo in the blood, **25**, 637.
- estimation of uric acid, **25**, 1123.
- Mansfield, C. B., researches on coal-tar, **1**, 244.
- obituary notice of, **8**, 110.
- Marangoni, C., and P. Stefanelli, influence of certain liquids in retarding or arresting the action of acids upon metals, **25**, 116.
- Mareet, W., constitution of blood and nutrition of muscular tissue, **24**, 574.
- remarks on the brine of salt meat, and on the distribution of albumin through muscular tissue, **17**, 405.
- chemistry of digestion, **15**, 407.
- fatty matters of human excrements in disease, **10**, 162.
- observations on the state of combination of fertilising matters in the soil, **24**, 296.
- researches on the constituents of gastric juice, **14**, 256.
- Marchand, R. F., atomic weight of carbon, **1**, 11 (p).
- Marchand and Erdmann. See Erdmann.
- Marignac, C., alleged influence of calcination on the heat of solution of metallic oxides, **25**, 217.
- researches on the density and expansibility of some solutions, **24**, 1125.
- researches on didymium and its principal compounds, **6**, 260.
- specific heats, densities, and expansion of some liquids, **24**, 94.
- Marignac's oil, **17**, 156.
- Markownikow, W., the hydrocarbon, C_7H_{14} , and its derivatives, **24**, 1027.
- Markownikow and Tupolew, new modification of pyrotartaric acid, **25**, 1094.
- Marquart and de Koninek. See de Koninek.
- Marshall, A., influence of certain organic and inorganic salts on the crystallising power of cane-sugar, **24**, 457.
- Martin, A., magnesium sulphate springs of Hunyadi Janos, near Ofen, **24**, 1021.
- Martin, S., the so-called "steel ore" or "codorus ore" of Pennsylvania, **25**, 59.
- Martins and Chancel, physical phenomena accompanying the rupture of hollow projectiles by the freezing of water, **25**, 976.
- Martius and Hofmann. See Hofmann.
- Maschke, O., separation of crystalline silicic acid from watery solutions, **25**, 671.
- Masse, chalks for marking cloth, &c., **25**, 1142.
- Massul and Rabuteau. See Rabuteau.
- Maskelyne, N. S., alcohol in the wax of *Copernicia cerifera*, **7**, 192.
- chemical composition of Canaüba wax, **22**, 87.
- oxidation of Chinese wax, **3**, 24.
- mineral constituents of meteorites, **24**, 116.
- investigation of the vegetable tallow from a Chinese plant, the "*Stillingia sebifera*," **8**, 1.
- Maskelyne, N. S., and W. Flight, mineralogical notices, **24**, 1; **25**, 1049.
- Mathiessen, A., alloys, **20**, 201.
- note on Messrs. Calvert and Johnson's paper on the action of acids on metals and alloys, **19**, 503.
- note on Prof. Bolley's communication "on some physical properties of the alloys of tin and lead," **15**, 106.
- a few notes on barium, **8**, 294.
- preparation of the metals of the alkalis and alkaline earths by electrolysis, **8**, 27.
- preparation of strontium and magnesium, **8**, 107.
- expansion of water, **19**, 30.
- obituary notice of, **24**, 615.
- Matthiessen, A., and G. C. Foster, researches into the chemical constitution of nactone and of its products of decomposition, **16**, 342; **21**, 357.
- Matthieu and Urbain, causes of variation in the proportion of oxygen in the arterial system, **25**, 253.
- Maugham, W., mode of treating copper ores and ores of other metals combined with sulphur, to ascertain the quantity of sulphur in such ores, and the quantity of copper in the native sulphuret, **1**, 8 (p).
- Maule, G., nitronesidine, **2**, 116.
- Maumené, E., calcination of lead oxalate, **24**, 1156.

- Maumené, E., saccharate of sodium chloride, **24**, 572.
 — action of water and heat, or of heat alone, upon sugar, **25**, 812.
 — two new acids from the oxidation of sugar, **25**, 812.
- Maxwell, F., adjustment of volumetric test-solutions, **25**, 1113.
- Mayer, A., alcoholic fermentation and mode of nutrition of the yeast-plant, **24**, 426.
- Mayer and Brazier. See Brazier.
- Mayrhofer, behaviour of arsenic acid to hydrochloric acid, **24**, 661.
- McDougall, A., mode of measuring the relative sensitiveness of photographic papers, **18**, 183.
- McLeod, H., new form of aspirator, **20**, 164.
 — modification of Berthelot's experiment for the formation of acetylene by imperfect combustion, **19**, 151.
 — new form of apparatus for gas analysis, **22**, 313.
 — apparatus for determining the quantities of gases existing in solution in natural waters, **22**, 307.
- McNab, W. R., transpiration of watery fluid by leaves, **24**, 850.
- Medicus, L., compounds of aldehydes with amides, **24**, 151.
- Medlock, H., researches on the amyl series, **1**, 368; **2**, 212.
- Medlock and Clarke. See Clarke.
- Mégevand and Daremberg, action of crystallised digitaline on the temperature of the body and on diuresis, **25**, 836.
- Méhu, C., preparation of crystallised indigotin by means of phenol, **25**, 250.
 — iodised cotton, **24**, 967.
 — on a violet deposit in urine, **25**, 157.
- Meidinger, H., occurrence of ozone and peroxide of hydrogen in the electrolysis of sulphuric acid, **1**, 251.
- Meineke, K., estimation of sulphur and phosphorus in iron, **25**, 89.
- Meissner, G., copying drawings by photography, **24**, 867.
- Mellies and Filhol. See Filhol.
- Melms, F., action of cyanic acid on acrolein, **24**, 133.
- Melsens, M., steam-boiler explosions, **25**, 337.
- Mendelejeff, D., considerations on the system of the elements, **24**, 483.
 — change in volume of gases by pressure, **25**, 1067.
- Méne, C., preparation of hydrobromic and hydriodic acids, **3**, 74.
- van der Mensbrugge and Tomlinson. See Tomlinson.
- Menschutkin, N., relations between the amides and anilides of succinic acid, **25**, 496.
 — succinanilide, **25**, 497.
- Menschutkin and Jermolajew, chloracetamide and iodoacetamide, **24**, 150.
- Mercadante, M., action of hydrobromic acid on citric acid, **24**, 1047.
- Mereed, J., action of a mixture of red prussiate of potash and caustic alkali upon colouring matters, **III**, 320.
 — obituary notice of, **20**, 395.
- Mercier, G., manufacture of red lead, **25**, 182.
- Mereck, G., analysis of the water of the thermal spring of Bath, **III**, 262.
- Mereck, W., new organic base in opium, **1**, 408.
 — compounds of stibethyl, **9**, 278.
- Merget, A., precautions against the injurious influence of mercury on the workmen in the manufacture of mirrors, **25**, 933.
 — diffusion of mercurial vapours, **25**, 225.
- Merrick, J. M., testing of cochineal, **24**, 601.
 — determination of nickel by the battery, **24**, 1091.
- Merz and Coray, action of alkalis on nitrobenzene, **25**, 620.
 — and Kollarits. See Kollarits.
 — and Weith, amidobenzoic acid and carbon bisulphide, **24**, 238.
 — — perchlorophenol, **25**, 701.
 — — thioaniline and thiotoluidine, **24**, 566.
- Messel, R., oxethyl-compounds of strychnine, **24**, 148.
 — sulphomaleic acid, **24**, 131.
- Metz, A., areometric analysis of beer, **24**, 602.
- Meunier, S., geology of meteorites, **24**, 808.
 — metamorphism in meteorites, **24**, 503, 504.
 — constitution of grey serpentine, **25**, 603.
 — conversion of serpentine into tadjorite, **24**, 505.
 — the black colouring matter of tadjorite, **24**, 329.
- Meunier and Scheurer-Kestner. See Scheurer-Kestner.
- Meusel and Gill. See Gill.
- Meyer, A., origin of the chemical work in the production of organic matter in chlorophyll cells, **25**, 516.

- Meyer, A. H., the betaine of the phosphorus series, **24**, 1066.
- Meyer, C., separation of antimony from arsenic, **1**, 388.
- Meyer, E., gases enclosed in coal, **24**, 899; **25**, 798, 801.
- Meyer, E. L., action of zinc chloride, of nitrous acid, and of chloride of lime and hydrochloric acid on morphine, and of zinc chloride on papaverine, **24**, 264.
- Meyer, O., internal motion of gases, **24**, 797.
- Meyer, V., dibromobenzene, **24**, 119.
- action of sulphur on vapour of water; synthesis of sulphydric acid; preparation of pure zinc by electrolysis, **25**, 220.
- Meyer and Ador. See Ador.
- Meyer and Ascher. See Ascher.
- Meyer, V., and L. Dulk, on chloral, **25**, 246.
- Meyer, V., and O. Stüber, isomeric amyl nitrites, **25**, 474.
- — isomeric dibromobenzenes and dibromaniline, **25**, 303.
- — nitro-compounds of the fatty series, **25**, 682, 804.
- — action of nitrous ether on benzamide, **25**, 303.
- Meyer, V., and C. Wurster, derivatives of the solid dibromobenzene, **25**, 1003.
- Michaelis, A., meaning of the atomicity of elements, **25**, 378.
- phosphoric bromochloride, **25**, 282.
- molecular combinations of phosphoric bromochloride with bromine, **25**, 670.
- decomposition of phosphoric sulphobromide by water and alcohol, **25**, 282.
- phosphoric sulphobromochloride, **25**, 283.
- action of phosphorous chloride on anhydrides and chlorides, **24**, 491; **25**, 222.
- constitution of phosphorus compounds, **25**, 982.
- sulphuryl chlorides, **24**, 489.
- Michaelis and Geuther. See Geuther.
- Middleton, J., analysis of a cobalt ore found in Western India, **III**, 39.
- fluorine in recent and fossil bones, and the sources from which it is derived, **II**, 134.
- Miescher, F., chemical composition of pus-corpuscles, **24**, 742.
- nuclear structures in the yolk of the hen's egg, **24**, 746.
- Miller, J. T., estimation of morphine in opium, **25**, 181.
- Miller, F. B., application of chlorine gas to the toughening and refining of gold, **21**, 506.
- W. A., observations on the atomic volumes and boiling points of analogous organic liquids, **1**, 363.
- decay of gutta-percha and caoutchouc, **18**, 173.
- photographic transparency of various bodies, and the photographic effects of metallic and other spectra obtained by the electric spark, **17**, 59.
- observations on some points in the analysis of potable waters, **18**, 117.
- obituary notice of, **24**, 617.
- Miller, Graham, and Hofmann. See Graham.
- Miller, W. H., determination of crystalline forms of saline compounds of cane-sugar, **24**, 273.
- extract from a letter from, **I**, 29 (p).
- measurements of the double sulphates of zinc and sodium and of magnesium and sodium, **III**, 391.
- Millot, A., superphosphate, **25**, 1132.
- and Girard. See Girard.
- Mills, E. J., nitration of chloroform, **24**, 641.
- nitro-compounds, **17**, 153.
- nitro-compounds (Part II), with remarks on isomerism, **18**, 319.
- nitro-compounds (Part II, appendix), **19**, 363.
- sparteine, **15**, 1.
- Milne-Edwards, observations on Jeannell's gas thermo-regulator for high temperatures, **25**, 667.
- Mirm, J., tetronerythrin, a new organic colouring matter, **25**, 511.
- Mitchell, J., analysis of deep well-water from Messrs. Holt's brewery, Ratcliffe, **3**, 1.
- analysis of the water of the Hampstead Waterworks Company, **2**, 32.
- Mitscherlich, E., obituary notice of, **17**, 440.
- Mixter, W. G., estimation of sulphur in coal and in organic compounds, **25**, 1114.
- Moberg, protoxide of chromium, **1**, 390.
- Möhl, H., the tachylite and dolerite of the Sababurg in Hesse, **25**, 129.
- Moffat's ozone paper, action of light upon, **20**, 10.
- Mohlenfeld, J., the peptones of fibrin, **25**, 629.
- Mohr, F., influence of a change of specific gravity on the melting point, **25**, 460.

- Mohr, F., relation between the chemical constitution and refractive power of gases, **24**, 183.
- heat evolved in the formation of aqueous solutions, **24**, 474.
- unequal heat-conducting power of gases, **24**, 298.
- formation of rock-salt, **24**, 310.
- optical arguments on the nature of water of hydration, **24**, 183.
- Mohr and Pelouze, discrepancies in their statements respecting the solubility of gallotannic acid in ether, **13**, 325.
- Moldenhauer and Zinin, compound ureas, **8**, 158.
- du Moncel, T., the most economical arrangement of voltaic batteries with respect to their polar electrodes, **25**, 109.
- the most economical disposition of voltaic batteries with respect to the size of the plates, **24**, 1133.
- influence exerted in the voltaic battery by the size of the plates, **24**, 881.
- Monckhoven, preparation of collodion for photography, **25**, 532.
- Monier, E., composition of beers consumed in Paris, **24**, 1224.
- Montefiori-Levy and Kimpzel, phosphorus bronze, **24**, 860.
- Montgolfier, J., camphor-acids, **25**, 1098.
- Moody, Col. T., obituary notice of, **3**, 98.
- Moore, G., occurrence of amorphous sulphide of mercury in the mineral kingdom, **24**, 671.
- G. E., electrolysis of the substituted derivatives of acetic acid, **25**, 484; **24**, 701.
- Morin, J., new arrangement of the copper-zinc battery, **25**, 780.
- M., gelatiniform matter, albuminose, exalbumin, galactin, **24**, 1071.
- Morland, J., an ammonio-chrome-compound, **13**, 252.
- Morley, R. J., propione, the ketone of propionic acid, **4**, 1.
- obituary notice of, **13**, 168.
- Morley and Abel. See Abel.
- Morton, H., colour of fluorescent solutions, **24**, 992; **25**, 27.
- Moschini, L., action of sunlight on olive-oil, **24**, 1192.
- Moser, J., analyses of food-stuffs, **25**, 317.
- Mosler, reaction of the blood in leukaemia, **25**, 833.
- Moutier, J., dissociation from a thermodynamic point of view, **24**, 644.
- Mräzek, silicium and manganese in steel and bar iron, **25**, 1136.
- Muck, F., note on Fresenius' process for the recovery of molybdic acid from residues, **25**, 264.
- trithionic acid, **24**, 658.
- Müller, A. C., the aluminium chlorides of commerce, **25**, 930.
- combustion furnaces, **24**, 438.
- constant colour and intensity of light from clouds, for chromometry, **24**, 183.
- water-analysis with the "hydrotimeter," **24**, 582.
- water-analysis, sulphuric acid estimation, **24**, 439.
- Müller, Ar., red colour-printing with artificial alizarin, **24**, 603.
- preparation of an oxidised aniline-black, **24**, 1098.
- new process for the valuation of aniline colours, **25**, 331.
- recovery of tartaric and oxalic acids from the residues of the "discharge" process, **24**, 172.
- Müller, C., estimation of the value of chloral hydrate, **24**, 444.
- Müller, F. C. G., lecture apparatus for condensing ammonia, **24**, 186.
- derivatives of β -parabromosulphotoluene, **24**, 1055.
- action of phosphorus pentachloride on orthobromo-benzoic acid, **24**, 1055.
- Müller, H., note on a method for effecting the substitution of chlorine for hydrogen in organic compounds, **15**, 41.
- chlorobrominated ethylene, **17**, 420.
- new formation of malonic and succinic acids, **17**, 109.
- mineralogical contributions, **11**, 236.
- preparation of monochloroacetic and dichloroacetic acids, **17**, 398.
- note on rosolic acid, **11**, 1.
- Müller, H., and W. De la Rue. See De la Rue.
- Müller, H., and E. Ludwig. See Ludwig.
- Müller, H., and J. Stenhouse, preparation of chrysammic acid, **19**, 319.
- — picric ether, **19**, 235.
- Müller, J., alterations in potable waters, **25**, 388.
- Müller, J. J., green colour of leaves, **24**, 654.
- Müller, K., analysis of chloral hydrate, **24**, 254.
- Müller and Hübner. See Hübner.
- Müller, M., ethyl-sulphides, **24**, 904.
- Müller, O., synthesis of mandelic acid, **25**, 708.

- Müller, P., extracts of meat from a physiological point of view, **23**, 158.
- Müller, W., gold ruby glass, **24**, 972.
- decrease in chemical activity of hydrogen and of carbon monoxide in the reduction of ferrosiferic oxide by admixture with foreign gases, **25**, 281.
- Munder, G., and B. Tollens, transformation of allyl alcohol chloride into the isomeric dichlorhydrin, **25**, 999.
- — dibromopropionic acid, **25**, 402.
- Muir, M. M. P. M., action of dilute saline solutions on lead, **25**, 679.
- a double sulphide of gold and silver, **25**, 680.
- Mulder, E., allantoin and bodies derived therefrom, **24**, 1197.
- a method of qualitative analysis and synthesis, **24**, 156.
- Mulder, E., and F. v. Embden, electrothermic methods of analysis and synthesis, **24**, 155.
- Munroe, C. E., use of porous hollow cones as filters, **24**, 1083.
- estimation of phosphoric acid, **24**, 583.
- Muntz, A., statics of industrial culture, **25**, 641.
- germination of oleaginous seeds, **24**, 1207.
- Murchison, Sir R. I., Bart., obituary notice of, **25**, 351.
- Muretow, lithium hydrate, **25**, 1074.
- succinyl-benzamic acid, **25**, 1097.
- Murray, R., phenomena of sounds produced in a bar of soft iron, II, 201.
- obituary notice of, **10**, 191.
- Musculus, dextrin, **25**, 1000.
- Muspratt, F., analysis of black ash, soda-ash, &c., **2**, 2.
- Muspratt, J. S., carbonate of alumina, **2**, 216.
- certain processes in which aniline is formed, II, 249.
- compounds of arsenious acid with albumin, with some remarks on Liebig's theory, **4**, 179.
- identity of bisulphethylic with hyposulphethylic acid, and of bisulphimethylic with hyposulphamethylic acid, **3**, 18.
- hyposulphethylic, hyposulphamethylic, bisulphethylic, and bisulphimethylic acids produced by the action of nitric acid on the sulphocyanides of ethyl and methyl, &c., **1**, 45.
- nitraniline, a new product of decomposition of dinitrobenzol, III, 111.
- salts of selenious acid, **2**, 42.
- salts of sulphurous acid, III, 292.
- toluidine, a new organic base, II, 367.
- Muspratt, J. S., obituary notice of, **24**, 620.
- Muspratt and Danson. See Danson.
- Muspratt and Hofmann. See Hofmann.
- Myers, J., the drying of gases, **25**, 594.
- hydrogen sulphide containing arsenic, **24**, 889.
- temperature of decomposition of hydrogen sulphide, **24**, 889.
- Mylius, E., chemical examination of *Sedum acre*, **25**, 1034.

N.

- Nahapetian, A., triethyl carbinol, **24**, 1035.
- Napier, J., cyanides of the metals, and their combinations with cyanide of potassium:—Part I. Cyanide of gold, II, 82; Part II. Cyanide of silver, II, 92.
- decomposition of the double cyanides by an electric current, II, 158.
- electrical endosmose, III, 28.
- unequal decomposition of electrolytes, and the theory of electrolysis, III, 47.
- remarks on the action of heat on gold, and on its alloy with copper, **10**, 229.
- remarks on metallic deposits found in two chimneys attached to reverberatory furnaces, one being used for melting an alloy of silver and copper, and the other an alloy of silver and gold, **11**, 168.
- decomposition of metallic salts by an electric current, II, 255.
- solubility of the metals in persulphate and perchloride of iron, II, 16.
- Natanson, J., substitution of the aldehyde-radicals in ammonia, **8**, 150.
- Naumann, A., dissociation-tensions of ammonium carbonate, **24**, 1195.
- time required for the dissociation and reproduction of ammonium carbonate, **25**, 79.
- time required for the evaporation and condensation of solid bodies, **24**, 879.
- Neilson, J. B., obituary notice of, **18**, 345.
- Nencki, M., researches on the uric acid group, **24**, 1058; **25**, 423.
- Nencki and Schultzen. See Schultzen.
- Nesbitt, J. C., improved method of detecting alumina, III, 57.
- phosphoric acid and fluorine con-

tained in different geological strata, **1**, 233.

Nesbitt, J. C., quantitative estimation of phosphoric acid, and its presence in some of the marls of the upper greensand formation, **1**, 44.

Neubauer, C., arabin, **8**, 307.

— detection of morphine and strychnine in presence of one another, **2-4**, 443.

— quantitative estimation of tannin in oak bark, **2-4**, 594.

Neumann, P., suggestion for the prevention of explosions in working with fulminating mercury and other inflammable compositions, **25**, 267.

Newlands, J. A. R., ammoniacal deposit formed in the process of drying blood, **18**, 340.

— construction of tables exhibiting the composition and mutual relations of organic bodies, **15**, 36.

Niedzwiedski, J., trinkerite from Styria, **2-4**, 1179.

Nichols, W. R., solubility of oxalates of alkali-metals, **2-4**, 548.

Nicholson, E., volumetric process for the analysis of waters, **15**, 468.

— estimation of combined carbonic acid in water, **25**, 524.

— delicate test for nitric acid in water, **25**, 324.

— the state of combination of silicic and carbonic acids in water, **25**, 525.

— specific gravity of urine, as a measure of its solid constituents, **16**, 25.

Nicholson, E. C., composition of caffeine, and of some of its compounds, **11**, 321.

— cumidine, **1**, 2.

— compounds of phosphoric acid with aniline, **11**, 227.

Nicholson, E. C., and F. A. Abel. See Abel.

Nilssen, L. F., the sulphides of arsenic, **25**, 599.

Noad, H. M., action of nitric acid on eynol, **11**, 421.

— analysis of the saline water of Purton, near Swindon, North Wilts, **1-4**, 43.

— note on the solubility of sulphate of baryta in hydrochloric acid, **9**, 15.

— composition of certain well-waters in the neighbourhood of London, with some observations on their action on lead, **4**, 20.

Nobbe, Schroeder and Erdmann, action of potassium on vegetation, **25**, 165.

Noble, A., azobenzol and benzidine, **8**, 292.

Nöllner, C., lüneburgite, **2-4**, 326.

— estimation of nitrogen, **1**, 381.

Nordenskiöld, A., meteoric iron from Greenland, **25**, 603.

Nordström, double salts of mercuric sulphocyanate, **25**, 626.

Normandy, A., obituary notice of, **18**, 345.

Northcote, A. B., obituary notice of, **23**, 299.

Northcote and Church. See Church.

Norton, S. A., a new platinum chloride, **25**, 680.

Nowak, J., the quantity of nitrogen in muscular tissue, **25**, 512.

O.

Obolensky, J., mucin of the sub-maxillary gland, **2-4**, 949.

— S., the mucous tissue of the umbilical cord, **25**, 311.

Odling, W., constitution of acids and salts, **7**, 1.

— detection of arsenic in copper, **16**, 247.

— atomic weights of oxygen and water, **11**, 107.

— constitution of hyposulphurous acid, **22**, 180, 256.

— reciprocal precipitation of the metals, **9**, 289.

v. Oefele, A., new class of organic sulphur-compounds, **17**, 105.

Ogilvie, T. P., separation of phosphoric acid from ferric oxide, alumina, lime, and magnesia, **25**, 920.

Oidtmann, pyrophotography, **25**, 856.

Oppenheim, A., observations on the allyl group, **2-4**, 906.

— artificial formation of camphor, **25**, 1010.

— camphor of peppermint, **15**, 24.

— cymene from oil of turpentine, **25**, 393.

— cymene from turpentine and from lemon oil, **25**, 1009.

— action of sulphuric acid on organic chlorides containing oxygen, **2-4**, 125.

Oppenheim and Ador. See Ador.

Oppenheim and Biedermann. See Biedermann.

Ossikovsky, J., guanidine, 1100.

Ossikovsky, J., and G. Barbaglia, ethylic acetyloxamate, **25**, 1091.

— note on mesoxalic acid, **25**, 1001.

Oxley, J., some constituents of ericaeons plants, **25**, 909.

P.

- Paalzow, F., influence of cutaneous irritation on tissue change, **23**, 312.
- Padulli and Frapolli. See Frapolli.
- Page, D., and A. D. Keightley, solubilities of certain salts of sodium and potassium, **23**, 566.
- Palmer, R., quick method of estimating copper and silver, **25**, 926.
- Palmer, W. J., rough notes on the formation of nitre, as observed in the north-western provinces of India, **21**, 318.
- Papillon, F., relations of the spectral properties of the elements to their physiological properties, **24**, 1078.
- Parker, J. S., optical examination of the Bessemer flame, **24**, 98.
- Parkes, E. A., effect of diet and exercise on the elimination of nitrogen, **24**, 412.
- Parkinson, J., alloys of magnesium, **20**, 107.
- phosphide of magnesium, **20**, 309.
- Parnell, E. A., equilibrium of the temperature of bodies in contact, **1**, 32 (p).
- formation of mellone, **1**, 5 (p).
- influence of water in chemical reactions, **1**, 15, (p).
- Parnell, E. W., estimation of phosphoric acid, **24**, 441.
- Parnell, J., reducing action of peroxide of hydrogen and carbolic acid, **21**, 356.
- Parry, J., new form of gas-apparatus, **25**, 182.
- application of the Sprengel pump to the estimation of carbon in iron and steel, **25**, 924.
- application of the Sprengel pump to the analysis of coke, **25**, 321.
- Pasteur, L., amylic alcohol, **8**, 277.
- aspartic and malic acids, **5**, 62.
- researches on the cinchona alkaloids, **6**, 273.
- characteristic properties of the two acids which compose racemic acid, **3**, 79.
- transformation of the two kinds of tartaric acid into racemic acid. Discovery of inactive tartaric acid. New method of separating racemic acid into the two tartaric acids, right and left, **6**, 277.
- Patera, A., means of protecting textile fabrics, &c., from fire, **25**, 337.
- Paternò, E., benzylated phenol, **25**, 702.
- action of bromochloride of phosphorus on chloral, **25**, 247.
- two new chlorobromides of carbon, **25**, 232.
- synthesis of a new phenol, **25**, 241.
- Paternò, E., an attempt to determine the molecular weights of saline substances, **25**, 1068.
- Paternò, E., and G. Pisati, ethylidene bromide, **25**, 233.
- action of phosphorus pentachloride on dichloraldehyde, **24**, 1190.
- Patterson, T. L., experiments with Fehling's copper solution, **23**, 1122.
- the part which ferric oxide and alumina play in the manufacture of superphosphates, and the comparative value of mineral phosphates, **23**, 848.
- Pattinson, H. L., obituary notice of, **12**, 169.
- Paul, B. H., quality of chloral hydrate, **24**, 134.
- connection between the mechanical quantities of malleable iron and steel, and the amount of phosphorus they contain, **22**, 81.
- Pawlowsky, formation of a new tertiary alcohol, **23**, 1093.
- Payen, M., cellulose and lignin, **24**, 575.
- Peckolt, T., *Persea gratissima*, **24**, 727.
- Pedler, A., isomeric forms of valeric acid, **21**, 74.
- Peligot, E., distribution of potash and soda in plants, **23**, 86.
- Pellet and Champion. See Champion.
- Pelleggio, detection of iodine in the state of potassium iodide in urine, **25**, 1124.
- Pelouze, J., sorbin, a new saccharine substance extracted from the berries of the mountain-ash, **5**, 281.
- obituary notice of, **21**, xxv.
- Pelouze and Mohr. See Mohr.
- Penny, F., valuation of indigo, **5**, 297.
- valuation of protochloride of tin, **7**, 50.
- valuation and composition of protochloride of tin, **4**, 239.
- obituary notice of, **23**, 301.
- Pepper, J. H., new test for strychnine, **5**, 170.
- Perceval, S., occurrence of websterite near Brighton, **24**, 1179.
- Percy, J., new hydrated phosphate of lime, **11**, 222.
- Perkin, W. H., action of acetic anhydride on the hydrides of salicyl, &c., **20**, 586.
- artificial alizarin, **23**, 133.
- derivatives of anthracene, **24**, 13.
- anthraflavic acid, **24**, 1109.
- some new benzylic derivatives of the salicyl series, **21**, 122.

- Perkin, W. H., new bromine derivative of camphor, **18**, 92.
- action of chloride of cyanogen on naphthylamine, **9**, 8.
- note on the action of chloride of lime on aniline, **22**, 25.
- note on the chloromaleic acid obtained from tartaric acid, **16**, 198.
- colouring matters derived from coal-tar, **1-4**, 230.
- note on coumaric acid, **22**, 191.
- derivatives of coumarin, **24**, 37.
- artificial production of coumarin, and formation of its homologues, **21**, 53.
- some new bromine-derivatives of coumarin, **23**, 368.
- hydride of aceto-salicyl, **21**, 181.
- hydride of butyro-salicyl and butyric coumaric acid, **21**, 472.
- derivatives of the hydride of salicyl, **20**, 418.
- action of nascent hydrogen on azodinaphthylidiamine, **18**, 173.
- Regnault's chlorinated chloride of methyl, **22**, 260.
- note on the formation of pyridine from naphthalene, **18**, 9.
- basicity of tartaric acid, **20**, 138.
- Perkin and Church. See Church.
- Perkin, W. H., and B. F. Duppa, bibromo-succinic acid and the artificial production of tartaric acid, **13**, 102.
- — biniodacetic acid, **13**, 1.
- — action of bromine on acetic acid, **11**, 22.
- — action of bromine on brom-acetic acid, **12**, 1.
- — constitution of glyoxylic acid, **21**, 197.
- — action of pentachloride of phosphorus on tartaric acid, **13**, 9.
- Pernod, recovery of colouring matter and oxalic acid from the wash-waters of madder in garancin-making, **24**, 768.
- Perrins, J. D., berberine; contributions to its history and revision of its formula, **15**, 339.
- Personne, J., conversion of chloral into aldehyde by inverse substitution, **24**, 134.
- presence of selenium in sulphuric acid of French manufacture, **25**, 595.
- Persoz, J., dyeing of cotton fabrics with aniline black, **25**, 1140.
- decomposition of silver nitrate by heat, **1**, 189.
- double salts of pyrophosphoric acid, **1**, 183.
- composition of wolfram, **5**, 95.
- Petersen, K., influence of marl on the formation of carbonic acid and nitric acid in the soil, **24**, 751.
- Petersen, P., variations in the proportions of water, fat, and nitrogen in flesh, **25**, 1103.
- Petersen, T., derivatives of anthraquinone, **24**, 534.
- ceruleolactine and variseite, **24**, 1014.
- dinitrochlorophenol melting at 69°, **24**, 247.
- constitution of the nitrochlorophenols, **24**, 248.
- native phosphates of lime, **25**, 795.
- a new sodium metasilicate, **25**, 672.
- Petersen, T., and Baehr-Predari, chlorophenol-sulphonic acids, **24**, 240.
- — action of concentrated nitric acid on the chlorophenol-sulphonic acids, **24**, 244.
- Petersen and Böttger. See Böttger.
- Petit, A., blue colouring matter derived from escerine, **24**, 719.
- egg albumin, **24**, 572.
- new theory of fermentation, **24**, 897.
- preparation of neutral sulphate of escerine, **25**, 82.
- Pettenkofer's test for sugar, **14**, 31.
- Pettenkofer, M., volumetric method of estimating atmospheric carbonic acid, **10**, 292.
- Pfankuch, F., new modes of formation of hydrocarbons, **24**, 895.
- sulphoform and cyanoform, **24**, 901.
- Pfaundler, L., elementary deduction of the fundamental equation of the dynamical theory of gases, **24**, 884.
- amount of heat evolved or absorbed in the solution of sodium phosphate containing different quantities of water of crystallisation, **24**, 1131.
- molecular heat of the hydrates of sulphuric acid, **24**, 195.
- Pfeffer, W., albuminoids and their changes during germination, **25**, 907.
- influence of spectrum colours on the decomposition of carbon dioxide by plants, **25**, 1107.
- Pfeiffer, A., isobutyric aldehyde, **25**, 1001.
- Pfeiffer, E., rubidium in beet-root, **25**, 908.
- Pfeiffer and Claus. See Claus.
- Pflüger, E., diffusion of oxygen, and the process of oxidation in the organism, **25**, 1030.

- Pfundheller, C., new brilliant green for wool, **24**, 861.
- indulin blue, **25**, 855.
- dyeing wool amaranth-colour with fuchsine, **24**, 971.
- Phillips, J., Mallet's process for the preparation of oxygen, **24**, 859.
- Phillips, J. A., composition and properties of the carbonates of lead constituting the white lead of commerce, **4**, 165.
- chemical composition and microscopic constitution of certain Cornish rocks, **24**, 110.
- chemical examination of the metals and alloys known to the ancients, **4**, 252.
- traces of copper and lead in the ashes of lead, **2**, 1.
- connection of certain phenomena with the origin of mineral veins, **25**, 123.
- potasso-gypsite, a double sulphate of potash and lime, **3**, 348.
- Phillips, R., obituary notice of, **5**, 155.
- Phipson, T. L., note on the absorption-spectra yielded by certain organic substances, **22**, 324.
- description of an apparatus for generating sulphuretted hydrogen, **17**, 152.
- bicarbonate of ammonia of the Chinca Isles, **16**, 74.
- analysis of a biliary concretion; and a new method of preparing biliverdin, **20**, 455.
- some properties of chloral hydrate, **25**, 691.
- transformations of citric, butyric, and valerianic acids, with reference to the artificial production of succinic acid, **15**, 141.
- noctilucin, **25**, 1102.
- oxidation-blue of various Boleti, compared with a similar product obtained from phenol, **25**, 910.
- somberite, **15**, 277.
- vanadium ochre and other sources of vanadic acid, **16**, 244.
- Pierre, Is., new member of the series resulting from the action of chlorine upon Dutch liquid, **1**, 79.
- Prof. Graham's reply to the observations of, on the proportion of water in the magnesian double sulphates, **11**, 113.
- simultaneous distillation of water and butyl iodide, **25**, 239.
- solubility of silver chloride, **25**, 123.
- note on sulphurous acid and its combination with water, **1**, 383.
- Pierre, Is., and E. Puchot, fermentation alcohols, **25**, 886.
- — oxidation-products of the principal normal alcohols, **24**, 901.
- — phenomena observed in the distillation of certain mixtures of liquids insoluble the one in the other, **24**, 975.
- — simultaneous distillation of water and certain alcohols insoluble in water, **24**, 1029.
- — propyl and butyl bromides, **24**, 523.
- — propyl and butyl chlorides, **24**, 808.
- Piesse, S., observations on brewing, **1**, 23 (p).
- certain impurities in commercial sulphate of copper, **11**, 2.
- Piesse and Wright. See Wright.
- Pillitz, W., sugar estimation, **25**, 329.
- Pinner, A., acetal derivatives, **25**, 406.
- preparation of acetochloral from aldehyde, **24**, 384.
- compound of aldehyde and sulph-aldehyde, **24**, 383.
- constitution of crotonic chloral, **25**, 495.
- Pinner and Bischoff. See Bischoff.
- Pinner and Krämer. See Krämer.
- Piria, R., populin, **5**, 8.
- salicylic acid, **8**, 182.
- obituary notice of, **19**, 512.
- Pirogoff, nitration of α -toluic acid, **25**, 1097.
- Pisani, F., analysis of amblygonite (Montebrasite) from Montebras, **25**, 126.
- amblygonite and montebrasite, **25**, 793.
- analysis of nadorite, **24**, 1178.
- Pisati and Paternò. See Paternò.
- Planeth, H., resounding flames, **25**, 279.
- v. Planta-Reichenau, A., the Nolla slates in the canton of the Grisons, **25**, 991.
- Planté, M., use of secondary currents for accumulating and transforming the effects of the galvanic battery, **25**, 589.
- Plateau, J., vesicular vapour, **25**, 667.
- Playfair, L., on Baudrimont's proto-sulphide of carbon, **13**, 248.
- on a new method of making ferri-cyanide of potassium, and on a para-cyanogen compound, **9**, 128.
- formation of milk in the animal economy **1**, 46 (p).
- changes in composition of the milk

- of a cow, according to its exercise and food, **1**, 174.
- Playfair, L., on an instrument for graduating glass tubes invented by Prof. Bunsen, **III**, 54.
- palmitic acid, a fat acid related to the margaric series, **III**, 222.
- constitution of salts, **16**, 274.
- transformations produced by catalytic bodies, **III**, 348.
- determinations of the amount of work performed by various labourers, as compared with the amount of muscle consumption, **21**, 45.
- Playfair, L., and J. P. Joule, atomic volume and specific gravity, **II**, 401; **III**, 57, 199; **1**, 125, 139.
- Playfair, L., and J. A. Wanklyn, mode of taking the vapour-density of volatile liquids at temperatures below the boiling point, **15**, 142.
- Plösz, P., behaviour of animal substances containing phosphorus while undergoing decomposition, **24**, 734.
- condition of the double refractive substance of striped muscular fibre, **24**, 735.
- nuclei of the blood-corpuscles in birds and snakes, **24**, 740.
- paralbumin, **24**, 722.
- Plugge, P. C., testing of bones for iron, **25**, 257.
- value of phenol as a disinfectant, **25**, 904.
- Pohl, H., extraction of animal fats, **24**, 1097.
- Canadian oil as a solvent for extraction of oil-seeds, **24**, 969.
- Poeklington, H., optical analysis of bees-wax, **24**, 858.
- Ponomareff, synthesis of parabanic acid, **25**, 1099.
- Popp, O., ash-constituents of the seeds of *Acacia nilotica* and *Hibiscus esculentus*, **24**, 429.
- circular polarisation of castor oil, **24**, 388.
- excrement of the common bat, **24**, 424.
- inuloid, a soluble modification of inulin, **24**, 348.
- synanthrose, **24**, 348.
- urea, a normal and constant constituent of bile, **24**, 423.
- Popoff, A., oxidation of isobutyric acid, **24**, 126.
- oxidation of the ketones, **24**, 1057.
- oxidation-products of the benzylketones, **25**, 821.
- oxidation of the ketones, as a means of determining the constitution of acids and alcohols, **25**, 408.
- Popoff, A., and Th. Zincke, products of oxidation of aromatic hydrocarbons, **25**, 619.
- — oxidation of aromatic hydrocarbons having lateral chains, **25**, 815.
- Porrett, R., chemical composition of gun-cotton, **III**, 258.
- existence of a new vegeto-alkali in gun-cotton, **III**, 287.
- curious formation of Prussian blue, **1**, 35 (p).
- obituary notice of, **22**, vii.
- Post, J., and H. Hübner, ready liberation of hydrocyanic acid from nitrobenzene, dinitrobenzene, and similar compounds, **25**, 693.
- Pott, R., oxidation of conglutin from lupines by potassium permanganate, **25**, 830.
- composition of pulse from South Russia, and of the legumin obtained from it, **25**, 915.
- composition of the ashes of hard and soft wheat, **25**, 916.
- Potts, L. H., obituary notice of, **4**, 316.
- Pratesi, L., amidobenzenesulphonic acids, **25**, 245.
- Prentice, E. H., obituary notice of, **25**, 352.
- Prevost, E. W., phenol monochloracetate and amidacetate, **25**, 144.
- Prianicknikow, J., dimethyl-pseudo-propylcarbinol, **24**, 1035.
- Price, D. S., creatine, a constituent of the flesh of the cetacea, **3**, 229.
- new test for iodides, **4**, 155.
- action of light on sulphide of lead, and its bearing on the preservation of paintings in picture galleries, **18**, 245.
- tests for nitrates, and a new one for nitrites, **4**, 151.
- quantitative determination of sulphur, **17**, 51.
- Prinvaute, action of bromine on phosphorous chloride, **25**, 385.
- transformations of pyrophosphates, **25**, 596.
- Priwoznik, L., change in a bronze which had been buried for a long time, **25**, 882.
- formation of diammonio-zinc chloride in Leclanché's manganese-elements, **24**, 496.
- formation of metallic sulphides, **25**, 981.
- Prosser, R., obituary notice of, **8**, 109.

Prud'homme, solubility of oxides in alkali, **25**, 672.

Prud'homme and de Lalande. See de Lalande.

Puchot and Pierre. See Pierre.

Pugh, E., quantitative estimation of nitric acid, **12**, 35.

Pugh, E., obituary notice of, **18**, 346.

Pugh, Lawes, and Gilbert. See Lawes.

Puller, R., gravimetric estimation of arsenic, **24**, 586.

Puscher, C., coating of metallic articles with a nearly costless, permanent, shining black coat, **25**, 187.

— permanent copying paper for printed matter, **24**, 971.

— the colouring of veneers, **25**, 187.

Q.

Quineke, G., electrolysis, and conduction of electricity through liquids, **25**, 207.

R.

Raab, L., amounts of barium and manganese in certain minerals, **24**, 1177.

— proportion of starch in various sorts of potatoes, **25**, 1111.

Rabuteau, L., physiological action of opium alkaloids, **25**, 1107.

Rabuteau and Massul, physiological properties and metamorphoses of cyanates in the organism, **25**, 256.

— physiological action of kinic acid, and reduction of ferric chloride in the organism, **25**, 899.

v. Rad, A., allylsulphonic acid and some of its salts, **25**, 405.

Racowsky, M., researches on the various platinum compounds derived from the green salt of magnus, **1**, 189.

Railton, R., use of hydrogen in determining vapour-densities, and the acidification of alcohols by oxygen-gas or atmospheric air, **6**, 205.

— nitroglycerin and the products of its decomposition by potash, **7**, 222.

— new compounds of phosphorous acid, **7**, 216.

v. Rakowski, P., amide of naphthalene-carboxylic acid, **25**, 624.

Rammelsberg, C., the amblygonite of Montebras, **25**, 468.

— hydrated calcium carbonate, **24**, 801.

— hypophosphites, **25**, 787.

— reaction of the lead-chamber crystals with water, **25**, 595.

Rammelsberg, C., constitution of phosphites, **20**, 358.

— contributions to the knowledge of the slags from iron furnaces, **1**, 396.

— composition of natural tantalates and niobates, **25**, 189.

— composition of tantalie and niobie compounds, **24**, 1013.

— thallium compounds, **25**, 987.

— double salts of uranium acetate, **25**, 401.

— composition of white cast-iron, **25**, 677.

Ramsay, W., and R. Fittig, formation of orthotoluic acid by a new method, **25**, 491.

Raoult, F. M., transformation of cane-sugar into glucose by the action of light, **25**, 65.

— researches on the thermic coefficients of hydroelectric and thermoelectric currents, **25**, 115.

von Rath, G., identity of amblystignite with hypersthene, **24**, 1179.

— babingtonite from Herbornseelbach in Nassau, **24**, 1180.

— the crystalline system of humite, **25**, 53.

— crystalline forms of humite, gadolinite, zinc oxide, iron pyrites, blödite, perowskite, **25**, 294.

— ilvaite from Nassau, **24**, 1180.

— lava block thrown out by Vesuvius in the eruption of April, 1872, **25**, 1081.

— contributions to mineralogy, **24**, 506; **25**, 289.

— new locality for monazite, **24**, 324.

— chemical composition of the sodio-calcic feldspars, **25**, 288.

Rathke, B., some cases of the formation of chemical compounds by insufficient affinities, **25**, 392.

— action of potassium sulphite on bodies containing CCl_4 , **25**, 388.

— sulphocarbonyl chloride and a new sulphochloride of carbon, or perchloromethyl mercaptan, **24**, 344.

Rathray, A., effects of change of climate on the human economy, **24**, 411.

Rauwenhoff and Gerland. See Gerland.

Reboul, E., hydrobromides and hydrochlorides of allylene, **25**, 393.

— identity of the hydrobromide and hydriodide of bromopropylene with the dihydrobromide and hydrobromiodide of allylene;—dihydrobromide of acetylene, **25**, 683.

— two new isomerides of propylene bromide, **25**, 683.

- Rechters, C., utilization of the residue obtained from roasting iron pyrites, **24**, 419.
- Recknagel, G., physical characters of carbonic acid, **24**, 884.
- Redtenbacher, J., atomic weight of carbon, **1**, 9.
- on a class of organic acids, **III**, 235.
- constitution of taurin, and of a body isomeric with it, **1**, 191.
- obituary notice of, **23**, 311.
- Redtenbacher and Liebig. See Liebig.
- Redwood, Graham, and Hofmann. See Graham.
- Reeks, T., action of a solution of caustic soda upon a stoneware jar, **III**, 315.
- Reichardt, E., ash analysis of the seed of *Hyoscyamus niger*, **25**, 263.
- blood and urine in leukaemia, **24**, 421.
- analysis of a cement stone, **24**, 678.
- hydrometry and the German scale of hardness, **25**, 88.
- modification of Schlösing's method of determining nitric acid, **24**, 439.
- Reichardt, E., and H. Hoehn. See Hoehn.
- Reichenbach, E., mulberry-leaves from Turkestan, **24**, 435.
- Reichert, E., a simple thermo-regulator, **25**, 383.
- Reimann, M., extraction of aniline colours, **24**, 861.
- new method of fixing aniline colours on cotton-wool, **25**, 340.
- amorphous silicic acid as mordant for colouring matters, **24**, 452.
- Reimer, A., endeavours to establish the art of tanning on a scientific foundation, **25**, 1144.
- Reimer, K., derivatives of isobutylic alcohol, **24**, 121.
- Reinsch, H., benzoic acid in gas-water, **25**, 1097.
- Reiset, M., observations on his remarks on the new method for the estimation of nitrogen in organic compounds, **1**, 197.
- Rembold, G., a derivative of gallic acid, **24**, 374.
- Remsen, Ira, benzene derivatives, **25**, 622.
- action of molten potassium hydrate on sulphobenzoic acid, **24**, 1052.
- new source of paraoxybenzoic acid, **24**, 369.
- parasulphobenzoic acid, **24**, 704.
- isomeric sulphosalicylic acids, **24**, 1052.
- Remsen, Ira, oxidation of toluene-sulphonic acids, **24**, 1052.
- Remsen, Ira, and Fittig. See Fittig.
- Renard, A., detection and estimation of earth-nut oil in olive oil, **25**, 180.
- Renault, B., new method of reproducing drawings, **25**, 856.
- Retschly and Hübner. See Hübner.
- Reun, F., hamatoxylin, **24**, 541.
- Reuss, A., two new pseudomorphs, **24**, 672.
- Reverdin, F., artificial alizarin, **25**, 621.
- Regnault, V., new manometer, **24**, 482.
- Reynolds, J. E., colloidal bodies containing mercury. Fatty ketones, **24**, 561.
- isolation of the missing sulphurea, **22**, 1.
- Reynolds, J. W., propylene, **3**, 111.
- Rheineck, H., aniline black, **25**, 853.
- colorimeter, **24**, 1223.
- estimation of iron and ferrocyanogen, **25**, 90.
- separation of iron oxide from uranium oxide, and estimation of phosphoric acid by means of uranium, **25**, 178.
- amount of combined water in certain double sulphates, **25**, 225.
- Ribau, J., on condensed aldehydes, with elimination of water: aldehydes, **25**, 810.
- Richard and Jamin. See Jamin.
- Richardson, T., analyses of farm-yard manure and of coal gas, **II**, 309.
- Richmond, H. R., bichromate of ammonia, and some of its double salts, **3**, 199.
- v. Richter, V., condensation of amylene, **25**, 1087.
- constitution of benzene derivatives, **24**, 686, 624; **25**, 692.
- action of potassium cyanide on bromonitrobenzene, **24**, 220.
- Richters, E., precipitation of small quantities of phosphoric acid by ammonium molybdate, **24**, 157.
- Riess, J., isobutylbenzene and isobutyl-anisol, **24**, 220.
- Riess, P., action of the secondary currents of the voltaic battery on the primary currents, and on one another, **24**, 884.
- Riley, E., new method of extracting hippuric acid in considerable quantity without evaporation of the urine; and on some of the products of its decomposition, **5**, 97.
- manufacture of iron and steel, **25**, 533.
- titanous acid, **12**, 13.

- Riley, E., general occurrence of titanite acid in clays, and the method employed to estimate it; analysis of iron ores and silicious minerals containing iron; separation of oxide of iron from titanite acid, and methods of estimating iron, **13**, 311.
- occurrence of titanium in pig-iron, and some remarks on the use of titaniferous minerals in the manufacture of iron and steel, **16**, 387.
- occurrence of vanadium in pig-iron smelted from the Wiltshire oolitic iron ore, **17**, 21.
- Rinne and Tollens, oxidation of allyl alcohol, **25**, 999.
- allyl cyanide, or crotonitrile, **25**, 1021.
- Ritter, E., transformation of albuminoid matters into urea by potassium permanganate, **25**, 157.
- blue colouring matter in the bile, **24**, 1204.
- colourless bile, **25**, 513.
- Ritthausen, H., rotatory power of glutamic and malic acids, **25**, 814.
- Ritthausen, H., and U. Kreusler, aspartic and glutamic acids among the decomposition-products of proteides, **24**, 721.
- leucine from vegetable proteides, **24**, 719.
- Rivot, L. E., extraction of gold and silver from their ores, **24**, 1219.
- Robert, J., new diffusion apparatus for extracting plant-juices, **24**, 1100.
- Roberts, W. C., occurrence of organic appearances in colloidal silica obtained by dialysis, **21**, 274.
- Robson, J. H., dibenzoylimide, a new derivative of oil of bitter almonds, **4**, 225.
- analysis of the water of the artesian well, Southampton, **4**, 7.
- Rochleder, F., caffeine, **3**, 87.
- Rodwell, G. F., solubility of sulphate of lead in hydrochloric and nitric acids, **15**, 59.
- effect of heating sulphate and sulphide of lead in hydrogen and carbonic oxide, **16**, 42.
- Romei, G., new method of detecting fuchsine, **25**, 1127.
- Romensky, A., physiological action of trichlorhydrin, **25**, 902.
- Rommier, E., the most volatile coal oils and dinitrobenzene, **25**, 1002.
- mesitylene, **25**, 1002.
- Ronalds, E., the most volatile constituents of American petroleum, **18**, 54.
- Rose, H. E., composition of the aqueous acids of constant boiling-point, **13**, 146; **15**, 270.
- Rose, H. E., absorption of chlorine in water, **8**, 14.
- some chemical facts respecting the atmosphere of dwelling houses, **10**, 251.
- perchloric ether, **15**, 213.
- perchloric ether and its hydrates, **16**, 82.
- isomorphism of thallium perchlorate with the potassium and ammonium perchlorates, **19**, 504.
- tungsten compounds, **25**, 286.
- vanadium, **21**, 322; **23**, 344; **24**, 23.
- Rose and Bunsen. See Bunsen.
- Rose and Dittmar. See Dittmar.
- Rose, H. E., and T. E. Thorpe, measurement of the chemical intensity of total daylight made at Catania during the total eclipse of December 22, 1870, **24**, 1141.
- Rose, G., formation of anhydrite occurring together with rock-salt, **25**, 126.
- auriferous glass, **1**, 76.
- errors which arise in the determination of the specific gravity of bodies when they are weighed in a highly divided state, **1**, 182.
- isomorphism of sodium nitrate with caespar, **24**, 197.
- zircon in the hypersthenite of the Radau Valley, near Harzburg, **24**, 205.
- Rose, H., amidobenzene-sulphonic acid, **25**, 405.
- mesitylene-sulphonic acids, **25**, 1019.
- sulpho-acids of benzene, **25**, 1016.
- sulpho-acids of the mesitylenes, **24**, 376.
- obituary notice of, **17**, 437.
- Rose's ammonium carbonates, **23**, 278.
- Rosenbusch, H., remarkable concretions of chalcedony from Brazil, **25**, 327.
- Rosengarten, action of nitric acid on brucine, **1**, 192.
- Rosengarten and Strecker, decomposition of caffeine by barium hydrate, **24**, 146.
- Rosenstiehl, A., formation of aniline-red, **25**, 420.
- formation of aniline-red, and on the isomeric toluidines, **25**, 822.
- separation of the two isomeric toluidines, **25**, 248.
- Rossi, A., synthesis of normal propyl alcohol from ethyl alcohol, **24**, 1030.
- Rossi and Lieben. See Lieben.

v. Rossum, A. J., juice of the larvæ of *Cimbex* species, **25**, 157.
 Rostand Stohmann. See Stohmann.
 Rother, P., acetophenylamide and some of its derivatives, **25**, 81.
 Roux, M., the artesian well at Rochefort, **24**, 1181.
 — existence of copper in certain waters, **24**, 1096.
 Rowan, T., estimation of manganese in spiegeleisen and ferromanganese, **24**, 756.
 Rowney; T. H., preliminary notice on the action of ammonia on the oils and fats, **7**, 200.
 — action of ammonia on sebæic ether, **4**, 334.
 — analysis of the ashes of the orange tree (*Citrus aurantium*), III, 370.
 — analysis of Bohemian glass as found in the combustion-tubes employed in organic analysis, III, 299.
 — new method of obtaining capric acid, and remarks on some of its salts, **4**, 372.
 — occurrence of capric and caprylic acids in some fusel-oils, **5**, 22.
 — solid compound obtained by distilling stearic acid with lime, **6**, 97.
 Rowney and Abel. See Abel.
 Ruckhert, C., muscarine, a vegetable base contained in *Agaricus muscarius*, **25**, 829.
 Rudnew, W., dinitraniline, **24**, 712.
 Rüdorff, F., the freezing of saline solutions, **25**, 781.
 — determination of glacial acetic acid, **24**, 1093.
 Ruhmkorff's coil, ignition of gunpowder by, **14**, 169.
 Rump, C., amount of copper in iron, **24**, 312.
 Runge's blue, **22**, 26.
 Russell, W. J., atomic weights of cobalt and nickel, **16**, 51; **22**, 294.
 — gas analysis, **21**, 128.
 — experiments on the application of the measurement of gases to quantitative analysis, **21**, 310.
 — new method of estimating sulphur, **7**, 212.
 Russell and Williamson. See Williamson.

S.

Saalmüller, fatty acids of castor oil, **1**, 80.
 Saame and Faust. See Faust.
 Sabanejew, A., action of water on antimonious chloride, **24**, 662.

Sacc, M., properties of drying oils, **25**, 183.
 — gallic acid, **24**, 706.
 Sachsse, R., nitrogenous compounds of milk-sugar, **25**, 71.
 Sadtler, S. P., the iridium-compounds analogous to the combinations of ethylene with platinum chloride, **25**, 48.
 Saillard, G., phosphoplatinic compounds containing toluidine, **25**, 826.
 Saint-Pierre, C., spontaneous decomposition of various acid sulphites, **25**, 224.
 Saint-Pierre and Estor. See Estor.
 Salet, G., luminosity of iodine vapour, **25**, 596.
 — primary spectrum of iodine, **25**, 873.
 — spectra of phosphorus and compounds of silicon, **25**, 27.
 — absorption-spectrum of sulphur, **25**, 382.
 — spectra of sulphur, selenium, and tellurium, **24**, 1145.
 — spectra of tin and its compounds, **24**, 1147.
 Salkowski, E., reaction of cholesterol with sulphuric acid, **25**, 1123.
 — on the combination of glucose with copper, and on Trommer's test, **25**, 1122.
 — comparative examination of the muscular substance of the heart in cases of rapid death, with and without fever, **25**, 1104.
 — physiological and chemical action of phenol in the animal organism, **25**, 627.
 — physiologico-chemical notices, **25**, 256.
 — estimation of potash in urine by tartaric acid, **25**, 1124.
 — formation of sulphuric acid and of urea, and behaviour of taurine in animal bodies, **25**, 1033.
 — estimation of urea and chlorides in urine containing potassium iodide, **25**, 1124.
 — determination of uric acid, **25**, 333, 844.
 Salkowski, H., direct formation of aromatic amido-derivatives, **25**, 149.
 — on the action of ammonia on nitranisic acid, and on the phenylene diamine of Griess, **25**, 1024.
 — chrysanisic acid, **24**, 555; **25**, 145, 713.
 — constitution of chrysanisic acid, **24**, 920.
 — triamidobenzene, **25**, 303.
 Salleron, a new colorimeter, **25**, 527.

- Salm-Horstmar's experiments on the growth of plants, **14**, 212.
- Sa'mon, F., use of phenol for detecting uræcine and curarine in chemical investigations, **25**, 331.
- Sandberger, F., lithia-mica in the Fichtelgebirge, **24**, 1180.
- rammelsbergite, **25**, 129.
- Sarnow, C., monochlorocrotonic acid, **24**, 1016.
- the monochlorocrotonic acid obtained from crotonic chloral, **25**, 689.
- Sarzeaud, Malaguti, and Durocher. See Durocher.
- Sawicki, A., is the absolute amount of acid in the urine greater on a day of exertion than on a day of rest? **25**, 637.
- Saytzeff, A. and M., behaviour of normal butyl iodide with alcoholic potash, **24**, 524.
- conversion of fatty acids into the corresponding alcohols, **24**, 227.
- conversion of succinic acid into the corresponding diatomic alcohol, **24**, 810.
- Scanlan, M., iodide of cyanogen in the iodine of commerce, III, 321.
- flashes of light observed during the crystallisation of strontium nitrate in the dark, I, 5 (p).
- Scanlan, M., and A. Anderson, experiments on gases generated in a sewer, **3**, 13.
- Schaal, E., products obtained from aspartic acid, **24**, 129.
- Schacht, C., determination of the amount of alkaloids in Peruvian bark, **24**, 1217.
- Schäfer, Dr., animal cellulose, **25**, 309.
- occurrence of chondrigen in the Tunicata, **25**, 309.
- Schäffer, L., bromal and the bye-products of its manufacture, **24**, 358.
- Schaffner, Max., preparation of thallium on the large scale, **25**, 1075.
- Scharling, E. A., exhalation of carbonic acid from the human body, I, 50 (p).
- Scheerer, H., analysis of commercial tin, **24**, 956.
- separation of magnesia from potash and soda, **24**, 955.
- Scheerer, Th., dephosphorising puddle-process for the preparation of good bar iron from phosphorised pig, **25**, 1135.
- Scheermesser, F., absorption of gases by soils, **24**, 853.
- Scheffer, E., notes on pepsin and bismuth, **25**, 1114.
- Scheibler, C., action of animal charcoal in sugar-making, **25**, 937.
- Scheibler, C., use of animal charcoal for the decolorisation of sugar-solutions in polarimetric analysis, **24**, 763.
- the non-existence of Gerhardt's parathionic acid, **25**, 681.
- solubility of sugar in mixtures of alcohol and water, **25**, 607.
- Schenk and Wanklyn. See Wanklyn.
- Schertel, A., chemical changes of silver in treasure-trove found at Hildesheim, **24**, 666.
- Schertel and Carstanjen. See Carstanjen.
- Scheurer-Kestner, A., use of gaize for the preparation of alkaline silicates, **24**, 763.
- action of hydro-chloric acid on ossein, and the determination of ossein in fossil bones, **24**, 733.
- Scheurer-Kestner, A., and C. Meunier, calorific value and composition of two Welsh coals, **25**, 91.
- — composition and heat of combustion of lignites, **25**, 183.
- Schiff, H., constitution of asculin, **24**, 700.
- synthesis of alkaloids, **24**, 143.
- anhydrides of salicylic acid, **25**, 819.
- the anilides of the so-called carbohydrates, **25**, 149.
- artificial conine, **25**, 116.
- synthesis of conine, **24**, 400.
- determination of colouring matter by spectrum analysis, **24**, 760.
- constitution of coumarin, **25**, 1007.
- gallic acid and gallic ether, **25**, 820.
- notes on organic analysis, **24**, 957.
- synthesis of sulphotannic acids, **25**, 1019.
- tannic acid, **24**, 550.
- tannic acid and derivatives therefrom, **25**, 245.
- constitution of tannic, elagic, and rugifallic acids, **25**, 1098.
- Schifferdecker and Lossen. See Lossen.
- Schinnerer, L., and T. Morawski, action of alkalis on lignite, **25**, 511.
- Schinz, C., chemistry of iron smelting, **24**, 446.
- Schischkin, A., cultivation experiments with flax, **25**, 911.
- Schlagdenhauffen, pyruvin, **25**, 1000.
- Schloesing, C., precipitation of muddy matter by weak saline solutions, **24**, 750.

- Schloesing, C., clearing of muddy waters, **24**, 868.
- Schloesing, T., solution of calcium carbonate by carbonic acid, **25**, 788, 880.
- state of a forest-soil before and after liming, **25**, 169.
- separation of potassium and sodium, **25**, 175.
- influence of vegetable mould on the porosity of soils, **25**, 839.
- Schlossberger, J., physiological action of analogously constituted chemical compounds, **3**, 179.
- Schmid, E. E., desmin, **24**, 1016.
- mesolite, **24**, 1018.
- Schmid, W., mangostin, **8**, 190.
- action of phosphorus dissolved in carbon disulphide on a solution of blue vitriol, **24**, 953.
- Schmidl, M., constitution of oil of cajuput, **14**, 63.
- Schmidt, A., coagulation of fibrin, **25**, 632.
- Schmidt, E., ketones, **25**, 892.
- action of liquid phosgene upon some amides, **25**, 718.
- Schmidt, E. A., nickel chromate and ammonio-nickel chromate, **24**, 108.
- Schmidt, R., oxaniline, **17**, 194.
- Schmiedberg, O., and O. Schultzen, kynurenic acid and the product of its decomposition, kynurine, **25**, 1028.
- Schmitt, R., and H. v. Gehren, fluobenzoic acid and fluobenzene, **24**, 368.
- Schneider, R., behaviour of alkaloids towards sugar and sulphuric acid, **25**, 1127.
- new sulpho-salts, **24**, 313.
- preparation of sulphochloride of mercury in the dry way, **8**, 257.
- Schneider, W., constitution of diamylene, **24**, 216.
- dinitrophenols, **25**, 241.
- pollen and the formation of wax, **25**, 639.
- Schneider and Hübner. See Hübner.
- Schnitzer, G., use of sodium silicate (water-glass) in soap making, **25**, 340.
- Schönbein, C. F., chemical effects produced by platinum, III, 17.
- influence exerted by electricity, platinum, and silver upon the luminosity of phosphorus, III, 404.
- peculiar property of ether and some essential oils, **4**, 133.
- action of hyponitric acid upon aqueous solutions of bromine and chlorine, III, 143.
- Schönbein, C. F., relation of ozone to hyponitric acid, III, 2.
- theory of positive and negative oxygen, **16**, 333.
- obituary notice of, **22**, x.
- Schönbein's ozone-paper, effect of light on, **20**, 10.
- Schönn, L., passivity of cadmium, **25**, 41.
- absorption-bands of chlorophyll, **25**, 383.
- analytical notices, **24**, 580.
- decomposition of minerals by sodium and potassium, **24**, 1210.
- Schorlemmer, C., chemical constitution of the so-called alcohol-radicals, **16**, 425.
- note on ethyl-hexyl-ether, **19**, 357.
- hydrides of the alcohol-radicals existing in the products of the destructive distillation of camel coal, **15**, 419.
- derivatives of hydride of heptyl, **16**, 216.
- the chemistry of the hydrocarbons, **25**, 425.
- note on the hydrocarbons contained in crude benzene, **19**, 356.
- hydrocarbons of the series, C_nH_{2n+2} , **24**, 896.
- constitution of hyposulphurous acid, **22**, 254.
- formula of the lead-chamber crystals (a correction), **25**, 627.
- identity of methyl and hydride of ethyl, **17**, 262.
- normal paraffins, **25**, 1083.
- Schorlemmer, C., and R. Dale, aurine, **24**, 466; **25**, 74.
- Schott, F., hydraulic properties of ignited gypsum, **25**, 268.
- Portland cement, **25**, 336.
- the so-called Scott's cement, **25**, 92.
- Schott, O., volumetric determination of zinc by sodium sulphide, **24**, 1215.
- Schramm, H., examination of essential oils, **24**, 1099.
- Schrauf, A., apatite, **24**, 1180.
- molybdates and vanadates of lead, **24**, 500.
- Schrauf, F., crystalline form of selenite, **25**, 227.
- Schreder, J., oxypicric or styplmic acid, **24**, 227.
- sappanin, **25**, 818.
- Schreiber and Hübner. See Hübner.
- Schreiner, Ph., melolonthine, **24**, 1201.

- Schröder, A., valeraldehyde, **24**, 559, 706.
- Schröder, J., seeds of the *Brassicæ*, **25**, 520.
- the spring period of birch and maple, **25**, 170.
- influence of sulphur dioxide on plants, **25**, 1108.
- Schröder, Nobbe, and Erdmann. See Nobbe.
- Schrötter, A., equivalent of phosphorus, **4**, 223.
- Schrötter's red phosphorus, **5**, 94.
- v. Schreiff, C., the aconite alkaloïds of Hübschmann, napelline and lycoctonine, and their physiological relations, **25**, 305.
- Schützenberger, P., acetyl derivatives of the carbo-hydrates, mannite, and certain other vegetable products, **25**, 66.
- new series of platinum compounds, **24**, 1009; **25**, 791.
- Schützenberger and Fontaine, phospho-platinum compounds, **25**, 1088.
- Schukoffsky, analysis of woman's milk, **25**, 513.
- Schulte, A., influence of quinine on oxidation in the blood, **24**, 1202.
- Schultz, G., diphenyl, **25**, 1005.
- Schultze, B., crystallised boracite in the salt beds of Stassfurth, **25**, 125.
- Schultze, H., E. Schulze, and C. Märcker, nutritive value of meadow grass, **25**, 914.
- Schultze, W., potato testing with solution of common salt, **25**, 188.
- influence of the secondary extract-formation in fermenting mash, **24**, 1223.
- Schultzen, O., and M. Neneki, formation of urea in the organism, **25**, 833.
- Schultzen and Schmiedberg. See Schmiedberg.
- Schultz-Sellaek, A. C., chemical and mechanical changes of the silver haloïd salts by light, **24**, 481; **25**, 29.
- on the clean surface possessed by films of albumin and tannin, and their use in photography, **24**, 1150.
- coloured photography, **24**, 867.
- colour of opaque media in the so-called colour photography, **25**, 30.
- sensitiveness of haloïd silver-salts to light, and connection of chemical and optical light-absorption, **24**, 302.
- compounds of sulphuric anhydride, **24**, 193.
- basicity of uranic oxide, molybdic acid, boric acid, and nitrous acid, **24**, 199.
- Schulze, E., composition and digestibility of the fat of meadow hay, **25**, 1037.
- nutritive value and composition of mangolds, **25**, 913.
- Schulze, F., gases contained in the swim-bladder of certain fresh-water fishes, **25**, 254.
- new method of preparing fully developed crystals, **25**, 271.
- daily observations at Rostock on the amount of carbon dioxide in the air, **25**, 668.
- action of sulphur on benzene, **24**, 219.
- Schulze and Henneberg. See Henneberg.
- Schulze, P., examination of sugar after treatment with sulphurous acid, **24**, 762.
- Schumann, C., influence of ammonium sulphocyanate on plant growth, **25**, 917.
- Schunck, E., anthraflavic acid, **24**, 380.
- some of the products of decomposition of chrysammic acid, **1**, 401.
- colouring matters of madder, **12**, 198.
- products derived from indigo-blue, **19**, 462.
- rubian and its products of decomposition, **5**, 56.
- some of the substances contained in the lichens employed for the preparation of archil and cudbear, **1**, 71.
- substances contained in *Roccella tinctoria*, III, 144.
- Schwachhöfer, F., occurrence and mode of formation of the phosphorite found on the Dniester in Russian Podolia, Galicia, and Buckowina, **25**, 56.
- Russian summer rye, **25**, 1036.
- Schwalbe's preparation of albumin, **25**, 1103.
- Schwanert, H., estimation of uric acid, **25**, 844, 929.
- Schwanert and Limpricht. See Limpricht.
- Schwartz, mellitic acid and its products of decomposition, **1**, 382.
- Schwartzberg, analysis of the supposed double oxalate of bismuth and potassium, **1**, 76.
- Schweitzer, E. G., analysis of the chalk of the Brighton cliffs, **1**, 29 (p).
- analysis of the Bonnington water, near Leith, Scotland, II, 201.
- Schweitzer, P., action of sulphurous acid on certain metals, **24**, 656.

- Scrugham, H., new compounds of phenyl, **7**, 237.
- Seabroke, G. M., spectrum of hydrogen at low pressures, **25**, 383.
- Secchi, P., spectroscopic researches on the sun, **25**, 1071.
- new method of spectroscopic observation of the sun, **24**, 798.
- Seegen, J., excretion of the nitrogen of the albuminoids decomposed in the body, **24**, 943.
- a method of determining a minimum amount of sugar in the urine, **25**, 636.
- is sugar a normal constituent of the urine? **25**, 634.
- determination of sugar and detection of albumin in urine, **24**, 1095.
- tissue-change during fasting, **25**, 84.
- Seely, C. A., ammonium, and the dissolution of metals without chemical action, **24**, 309.
- the colours of metals, **25**, 119.
- Sell, E., contributions to the history of the tolyl series, **16**, 186.
- Sell, E., and R. Biedermann, derivatives of fulminic acid, **25**, 412.
- Selle, A., vegetable cement of great adhesive power, **24**, 971.
- Sellmeier, abnormal sequence of colours in the spectra of certain substances, **24**, 885.
- Selmi and Sobrero. See Sobrero.
- Senff, composition of the seed-shells of white clover, **25**, 916.
- Senhofer, C., toluenedisulphonic acid and some of its derivatives, **25**, 1017.
- Senhofer and Barth. See Barth.
- Sestini, F., on the atomicity of nitrogen, with examples of the classification of nitrogen compounds, **25**, 982.
- detection of carbon bisulphide, **24**, 1090.
- reactions of carbon bisulphide, **24**, 1023.
- decolorising action of nitric acid on red wines, **25**, 853.
- examination of fresh and commercial poultry dung, **25**, 643.
- composition of mulberry leaves, **25**, 1035.
- derivatives of propionic acid, **24**, 234.
- absorbent power of red phosphorus, **24**, 1005.
- Settegast, H., lupine-seed as fodder, **25**, 642.
- Seward, H., estimation of acetic acid in lead acetate, **24**, 442.
- de Seynes, J. C., note on the pretended transformations of bacteria and mucedinea into alcoholic ferments, **25**, 261.
- Sharples, S. P., rocks and other dredgings in the Gulf Stream, **24**, 319.
- Shaw, H., preparation of the peroxides of barium, strontium, and calcium, **25**, 880.
- Shepard, C. U., the corundum region of North Carolina and Georgia, with a description of two gigantic crystals of that species, **25**, 995.
- meteoric stone of Searsmont, Maine, **24**, 1180.
- Sidot, J., crystalline phosphide of iron, **25**, 677.
- preparation and purification of carbon bisulphide, **24**, 799.
- Sidot, Th., exhibition of electrical phenomena by certain metals when rubbed with carbon bisulphide, **25**, 971.
- Sieglwart, E., application of certain fluorine-compounds to the preparation of frosted glass for photographic purposes, **24**, 166.
- glass manufacture, **25**, 1131.
- Siemens, C. W., increase of electrical resistance in conductors with rise of temperature, and its application to the measure of ordinary and furnace temperatures; also a simple method of measuring electrical resistance, **24**, 478.
- regenerative gas furnace as applied to the manufacture of cast steel, **21**, 279.
- Silbermann and Favre. See Favre.
- Silliman, B., composition of permanent illuminating gas obtained from the decomposition of petroleum naphtha, **24**, 864.
- Silliman, J. M., optical examination of the Bessemer flame, **24**, 97.
- Silva and Friedel. See Friedel.
- Silva and Crafts. See Crafts.
- Silvestri, O., examination of rain accompanied by meteoric dust, **25**, 1082.
- Simler, T., examination of the air in the barracks at Aargau, **25**, 515.
- Simon and Wibel, sarcolactic acid in urine, **24**, 423.
- Simpson, Maxwell, two methods for determining nitrogen in organic and inorganic compounds, **6**, 289.
- synthesis of succinic and pyrotartaric acids, **15**, 134.
- synthesis of tribasic acids, **18**, 331.
- Sims, O., phosphates of yttria, **1**, 7 (p).
- Sims, T. H., contributions to the knowledge of the laws of gas-absorption, **14**, 1.

- Sintenis, F., benzylic ethers, **24**, 909.
- Sirks, J. L., refraction and dispersion in selenium, **25**, 26.
- Skey, W., electric conductivity of metallic sulphides and oxides, compared with that of acids and saline products, **24**, 302.
- electromotive power of metallic sulphides, **24**, 652.
- electromotive and electrolytic phenomena developed in gold and platinum solutions of the alkaline sulphides and sulphuretted hydrogen, **24**, 481.
- presence in certain fibres of a substance susceptible of striking colorific changes when chemically treated, **25**, 1111.
- reduction of certain metals from their solutions by metallic sulphides, **24**, 601.
- poisonous principle of the Tutu plant, **24**, 152.
- capability of certain sulphides to form the negative pole of a voltaic battery, **24**, 652.
- absorption of sulphur by gold, and its effects in retarding amalgamation, **24**, 765.
- Smee, A. H., detection of organic and other nitrogenized matter in the atmosphere, **25**, 1040.
- Smith, A., hydrates of nitric acid, **III**, 399.
- Smith, E., determination of the amount of energy developed in the bodies of men engaged in treadwheel work, as compared with the amount of muscle consumption, **24**, 41.
- Smith, H. A., arsenic from alkali works, **25**, 1132.
- Smith, J., composition of the waters of the Dee and Don at Aberdeen, with an investigation of the action of Dee water on lead pipes and cisterns, **4**, 123.
- Smith, J. Denham, composition of an acid oxide of iron, **I**, 240.
- constitution of the sub-salts of copper, **I**, 221.
- ferric acid, **I**, 59 (p); **II**, 25.
- composition of some varieties of South American guano; with the description of a new method of estimating ammonia, and of a process for separating lime from magnesia, when these earths exist in combination with phosphoric acid, **II**, 140.
- Smith, J. Denham, and E. F. Teschemacher. See Teschemacher.
- Smith, J. L., determination of the alkalis in silicates by ignition with carbonate of lime and sal-ammoniac, **24**, 442.
- Smith, J. L., preparation of platinum black, **25**, 790.
- Smith, L., the Wisconsin meteoric iron, **24**, 329.
- meteorite of Danville, Alabama, **24**, 206.
- Smith, Prof., note on the composition of a boiling spring in New Zealand, **15**, 57.
- Smith, R. Angus, air of towns, **11**, 196.
- air and water of towns, **III**, 311.
- composition of atmospheric air, and rain-water, **25**, 33.
- preparation of a fixed manure from urine, **III**, 302.
- Smith, R. F., utilisation of waste substances in gas-liquor, **25**, 338.
- Smith, R. H., oxidation of ethylic and methylic benzoates, **20**, 131.
- ethyl-hyposulphurous acid, **22**, 302.
- Smith and Chapman. See Chapman.
- Smith, Chapman, and Wanklyn. See Wanklyn.
- Smith, Watson, isodinaphthyl, **24**, 1184.
- distillation of wood, **24**, 1101.
- Smyth, J., improvements in chlorimetry, **24**, 1084.
- Snelus, G. J., condition of carbon and silicon in iron and steel, **24**, 106.
- the chemical changes in Danks's rotatory puddling furnace, **25**, 931.
- Sobrero and Selmi, new compound of mercury, **5**, 86.
- Socoloff and Strecker, certain products obtained from hippuric acid, **5**, 73.
- Soleil's saccharimeter, **14**, 27.
- Solly, E., chemical lamp-furnace, **II**, 218.
- Sommaruga, E., indophan, a blue colouring matter derived from naphthyl-purpuric acid, **25**, 251.
- naphthylpurpuric acid, **24**, 238.
- Sommer, C., examination of rye-flour for foreign admixtures, **25**, 320.
- Sonnenschein, separation of the alkalis from magnesia by means of carbonate of silver, **1**, 387.
- Sonstadt, E., presence of calcium iodate in sea-water, **25**, 597.
- detection of gold in sea-water, **25**, 1119.
- estimation of iodine in kelp-liquors, mineral waters, &c., **25**, 1116.
- oxidising power of potassium iodate, **25**, 1074.
- manufacture of potassium iodide from the mother-liquors of kelp, **25**, 1130.
- Sorby, H. C., amount of sulphur and phosphorus in various agricultural crops, **III**, 281.

- Sorby, H. C., tints of autumnal foliage, **24**, 181.
- Soret, L., anomalous dispersion of certain substances, **24**, 885.
- Sorokin, W., structure of propylene chloriodide, **24**, 1027.
- Souchay, A., estimation of lime, **25**, 263.
- Spence, R., effects of cold on cast-iron, **24**, 445.
- Spencer, J., new compound obtained from benzol by the action of chloride of iodine, **7**, 244.
- action of hydrochloric acid on a mixture of acetone and alcohol, **7**, 247.
- an attempt to obtain the acids homologous with benzoic acid from the corresponding hydrocarbons, **7**, 245.
- Spencer's rotatory puddling furnace, **25**, 940.
- Sperlich, A., and E. Lippmann, benzoyl dioxide and its reaction with amylene, **24**, 1041.
- Spiller, J., some remarkable circumstances tending to disguise the presence of various acids and bases in chemical analysis, **10**, 110.
- oxidation of india-rubber, **18**, 44.
- estimation of phosphorus in iron and steel, **19**, 148.
- weathering of copper ores, **20**, 306.
- Spirgatis, H., crystalline substance from Alcamoco bark, **25**, 299.
- fossil resin, perhaps related to the amber-producing Flora, **24**, 892.
- Sprengel, H., detection of nitric acid, **16**, 396.
- researches on the vacuum, **18**, 9.
- determination of the weight of heterogeneous liquids, **19**, 455.
- Sprengel's vacuum-tube, transference of gases by, **20**, 246.
- Springmühl, F., use of aniline colours dissolved in collodion, **25**, 1143.
- transparent aniline lacquers, and a method of colouring mica, **24**, 862.
- colouring of paper, leather, &c., with aniline lakes, **25**, 339.
- dyeing of leather with coal-tar colours, **25**, 1046.
- iodine-green on alpaca with water-glass, **24**, 1098.
- uses of sodium, **24**, 863.
- Squire, W. S., caprylamine, **7**, 108.
- Staedel, W., benzophenone-sulphonic acid, **25**, 406.
- action of chlorine on ethyl chloride, **24**, 696.
- chlorine substitution-products of ethyl chloride, **25**, 394.
- Stamkart, F. J., method of determining the density of a liquid in a closed space, **25**, 383.
- Stammer, C., colour estimation, **25**, 527.
- simplified method of estimating carbonic acid in the saturating gas of sugar factories, **25**, 266.
- Stark, J. F., analysis of an earth-ball and an intestinal calculus from the horse, **24**, 425.
- Stark, W., obituary notice of, **17**, 436.
- Starkow, W., toxicology of the benzene group, of nitroglycerin, nitric acid, and sulphuric acid, **24**, 1078.
- Stas, J., phenomenon produced in the mutual precipitation of dilute silver-solutions, by the chlorides, bromides, and iodides of hydrogen and the alkali-metals, **25**, 25.
- Stefan, J., conduction of heat in gases, **25**, 591.
- motion and equilibrium, with special reference to the diffusion of gaseous mixtures, **24**, 884.
- Stefanelli and Marangoni. See Marangoni.
- Stein, W., theory of the colours of natural objects, **24**, 1150.
- new method of estimating morphine in opium, **25**, 180.
- cobalt ultramarine, **24**, 860, 1221.
- constitution of ultramarine, **24**, 166.
- supposed incapability of potash to form ultramarine, **25**, 451.
- Steinbrück, mineral waters of Neugaroczi, near Halle, **24**, 212.
- Steiner, A., isocyanuric acid, **25**, 625.
- action of potassium nitrite on ethyl chloracetate, **25**, 608.
- Stelzner, A., granulytes of Saxony, **24**, 807.
- Stenhouse, J., examination of astringent substances, **1**, 208.
- some astringent substances as sources of pyrogallie acid, **1**, 132.
- examination of cetine, ethal, oils of lauril, turpentine, hyssop, and assa-fetida, **1**, 43.
- chloranil, &c., **21**, 141.
- chloranil and bromanil, **23**, 6.
- preparation of berberine from *Coscinium fenestratum*, **20**, 187.
- action of chloride of iodine on certain organic substances, **17**, 327, 336.
- action of chloride of iodine on picric acid, **20**, 433.
- chrysammie ether, **19**, 324.
- compound of dextroglucose with bromide of sodium, **16**, 297.

- Stenhouse, J., note on fucosol, **25**, 298.
- means of detecting kinic (quinic) acid, **II**, 226.
 - East Indian grass oil, **II**, 122.
 - hydrate of the oil of laurel turpentine, **II**, 121.
 - larinic acid; a crystallisable principle found in the bark of the larch tree, **16**, 310.
 - occurrence of mannite in the *Laminaria saccharina* and other seaweeds, **II**, 136.
 - products of the distillation of meconic acid, **II**, 1.
 - some of the salts of meconic and comenic acid, **II**, 113.
 - note on morindone, **17**, 333.
 - action of nitric acid on picramic acid, **21**, 150.
 - action of nitric acid on various vegetables, with a more particular examination of *Spartium scoparium*, **4**, 213.
 - note on nitro-erythroglucin, **16**, 399.
 - nitrogenated principles of vegetables as the sources of artificial alkaloïds, **13**, 309.
 - contributions to the history of orcin, **25**, 297.
 - nitro-substitution compounds of the orcins, **24**, 357.
 - platinised charcoal, **8**, 105.
 - pyrogallic acid, and some astringent substances which yield it, **I**, 127.
 - reduction of the salts of peroxide of iron by means of vegetable substances, **II**, 120.
 - resin of the *Xanthorrhœa hastilis* or yellow gum-resin of New Holland, **III**, 10.
 - styphnic or oxypieric ether, **19**, 236.
 - some of the substances which reduce oxide of silver, and precipitate it on glass in the form of a metallic mirror, **II**, 242.
 - theine and its preparation, **I**, 215, 237.
 - note on some varieties of *Orchella*, and products obtained therefrom, **20**, 221.
 - examination of select vegetable products from India, **9**, 226.
- Stenhouse and Müller. See Müller.
- Stenhouse, Graham, and Campbell. See Graham.
- Stiasny, A., alum crystallisation, **25**, 188.
- Sticht, J. C., composition of crude tartar, **24**, 867.
- Stingl, J., graphite from Styria, **24**, 203.
- analysis of a rock and some ochreous deposits from the mineral springs of the Toplitz basin, **24**, 1171.
 - softening of water with lime, **25**, 272.
- Stockhardt, A., Chinese oil-bean, **25**, 1034.
- injurious influence on vegetation of the fumes from smelting works and coal fires, **25**, 1109.
- Stockhardt, J., nitrogen as plant food, **25**, 1112.
- Stoddart, E., analysis of chrome-iron ore, **24**, 762.
- Stoikowitsch, S., obituary notice of, **20**, 397.
- Stohmann, Frühling, and Rost, metamorphosis of albuminous substances in the bodies of ruminants, **24**, 728.
- Stokes, G. G., existence of a second crystallisable fluorescent substance (pavin) in the bark of the horse-chestnut, **11**, 17.
- application of the optical properties of bodies to the detection and discrimination of organic substances, **17**, 304.
 - note on pavin, **12**, 126.
 - optical characters of purpurin and alizarin, **12**, 219.
 - a reaction of quinine, **22**, 174.
- Stokvis, B. J., reducible bye-product of the oxidation of bile-pigment, **25**, 308.
- Stolba, F., cleansing of glass vessels soiled with petroleum, **24**, 972.
- coating of metals with nickel and cobalt, **24**, 972.
 - loss of weight of platinum crucibles in a gas flame, **25**, 266.
- Strakosch, J., derivatives of benzidine, **25**, 503.
- derivatives of benzylamine, **25**, 1026.
- Strassburg, G., influence of acids on the oxygen of hæmoglobin, **25**, 312.
- modification of Pettenkofer's test for bile-acids in urine, **25**, 334.
- Strecker, A., chemical examination of the bile of the ox, **1**, 92, 413.
- decomposition of brucine by nitric acid, **7**, 273.
 - resolution of cholic acid into glycocholic and non-nitrogenous acids, **1**, 344.
 - artificial production of cinnamon oil, **7**, 280.
 - behaviour of some diazo-com-

pounds with alkaline bisulphites, **24**, 1196.

Strecker, A., new base from the juice of flesh, **10**, 121.

— compounds of hydrargomethyl and hydrargethyl, **7**, 277.

— hydrocyanaldine, **7**, 275.

— red colouring matters of madder, **3**, 243.

— formation of propionic acid, **7**, 276.

— constitution of quinine, **7**, 277.

— base from strychnine, **25**, 79.

— contributions to the history of tannic acid, **5**, 102; **7**, 271.

— artificial production of taurine, **7**, 281.

— obituary notice of, **25**, 353.

Strecker and Rosengarten. See Rosengarten.

Strecker and Socoloff. See Socoloff.

Streng, A., researches on feldspars, **25**, 50.

— occurrence of tridymite, **25**, 128.

Strohecker, chemical substitution in plants, **24**, 428.

Strüver, H., siderite as a pseudomorph after calcspar and bitter spar, **25**, 227.

Struve, H., separation of the colouring matter of blood by a solution of tannin, **25**, 929.

— determination of nitrates, nitrites, and solutions of hydrogen peroxide by solution of indigo, **25**, 922.

— effect of active oxygen on pyrogallie acid, **25**, 703.

— ozone, hydrogen peroxide, and ammonium nitrite, **25**, 35.

— preparation of the peroxides of barium, strontium, and calcium, **25**, 880.

Struve and Svanberg, combinations and atomic weight of molybdenum, **1**, 393.

Stuart and Baker. See Baker.

Stüber, O., tribromaniline, **25**, 305.

Stüber and Meyer. See Meyer.

Subic, S., temperature constants, **25**, 591.

Süssenguth and Jannasch. See Jannasch.

O'Sullivan, C., transformation products of starch, **25**, 579.

Svanberg and Struve. See Struve.

Swan, development of carbon photographic pictures by means of potassium permanganate, **25**, 338.

— action of light on mixtures of alkaline dichromates and gelatin, **24**, 304.

Swensson, N., sulphites of copper and silver, **24**, 1169.

Syme, J., vulcanised caoutchouc, **24**, 970.

Symons, W., description of a combined maximum and minimum mercurial thermometer, **15**, 299.

T.

Tait and Andrews. See Andrews.

Tamm, Hugo, estimation of antimony and separation of antimony from other metals, **25**, 176.

— assaying of bismuth ores, and separation of bismuth from other metals, **25**, 378.

— new precipitating reagent of copper, **24**, 1091.

— ferrotungstine, a new mineral, **25**, 992.

— metallurgy of manganese, **25**, 1076, 1143.

— new method of estimating zinc, **24**, 1214.

Tappeiner, H., decomposition of albumin by potassium permanganate, **25**, 252.

Turner, A. P., obituary notice of, **25**, 357.

Tate, N., action of boracic acid on the salts of the more volatile acids at high temperatures, **12**, 160.

Tatlock, R., sources of error in volumetric analysis, **24**, 156.

Taylor, J., remarks on Bessemer's process for the manufacture of iron, **10**, 151.

Taylor, T., improved forms of chemical apparatus, **11**, 315.

Tennent, J., obituary notice of, **21**, xxix.

Terry and Hübner. See Hübner.

Teschemacher, E. F., analysis of gold dust from the coast of California, **2**, 193.

— various substances in the guano deposits and in their vicinity, **11**, 13.

— gum-cotton, **11**, 253, 258.

— obituary notice of, **16**, 434.

Teschemacher, E. F., and J. Denham Smith, estimation of sulphur by barium, **24**, 1085.

Teschemacher, J. E., wax of the Chamberops, **11**, 24.

Tessié du Motay and Maréchal, preparation of hydrogen gas, **24**, 166.

v. Than, C., formation of ozone in rapid combustion, **24**, 483.

- v. Than and Wanklyn, action of metals upon iodide of ethylene, **12**, 258.
- Thiellkuhl, methin-trisulphonic acid, **21**, 196.
- Thénard, A., decomposition of carbon dioxide under the influence of the electric discharge, **25**, 667.
- apparatus for submitting gases and vapours to the electric discharge, **25**, 970.
- Thénard, A., and P., comparison of the action of ozone on sulphate of indigo and on arsenious acid, **25**, 977.
- Thénard, Baron, obituary notice of, **11**, 182.
- Thénard, P., quantitative determination of ozone, **25**, 921.
- action of potassium permanganate on water charged with oxygen under the influence of a freezing mixture, **25**, 921.
- Thiebaud, C. O., bark of *Juglans cinerea*, **25**, 909.
- Thierceelin, calcium borate from Tarapaca, Peru, **25**, 794.
- Thompson, J., obituary notice of, **4**, 347.
- Thompson, J. B., pyroplating, **25**, 1045.
- pyrogilding, **25**, 1134.
- Thomsen, J., affinity of hydrogen for chlorine, oxygen, and nitrogen, **25**, 215.
- the phenomenon of affinity according to multiples of common constants, **25**, 457.
- criticism of the numbers calculated by Berthelot in his papers "Sur la Chaleur de Formation des Azotates," &c., **25**, 459.
- beryllium-platinum chloride, **24**, 202.
- inaccuracy of Favre and Silbermann's thermo-chemical determinations made with the mercury calorimeter, **24**, 878.
- theory of the molecular motions of gases, **24**, 884.
- heat of neutralisation, **24**, 875.
- heat of neutralisation of organic and inorganic bases soluble in water, **24**, 473.
- heat of formation of the oxygen-acids of nitrogen, **25**, 781.
- decomposition of soluble metallic sulphides by water, **25**, 672.
- thermo-chemical researches, **24**, 468.
- Thomson, A. M., obituary notice of, **25**, 357.
- Thomson, J., analysis of the Tunbridge Wells water, **10**, 223.
- Thomson, R. D., fattening of cattle, **III**, 205.
- chemical composition of the waters of the metropolis during the autumn and winter of 1854, **8**, 97.
- obituary notice of, **18**, 314.
- Thomson, T. S., artificial magnetic oxide of iron, **1**, 14 (p).
- Thomson, Sir W., constant form of Daniell's battery, **24**, 102.
- Thorey, E., hyoscyamine, **24**, 405.
- Thorpe, W., reduction of the oxides of nitrogen by metallic copper in organic analysis, **10**, 359.
- Thorpe and Chapman. See Chapman.
- Thorpe, T. E., analysis of the ashes of a diseased orange tree, **21**, 515.
- amount of carbonic acid contained in the atmosphere of tropical Brazil during the rainy season, **20**, 199.
- amount of carbonic acid contained in sea-air, **20**, 189.
- new chromium oxychloride, **23**, 31.
- note on the specific gravity and boiling point of chromyl dichloride, **21**, 514.
- action of nitric acid containing lower oxides of nitrogen on silver chloride blackened by light, **25**, 455.
- nontronite, **23**, 29.
- contributions to the history of the phosphorus chlorides, **25**, 38.
- action of phosphorus pentasulphide on tetrachloride of carbon, **25**, 452.
- degree of solubility of silver chloride in strong nitric acid, **25**, 453.
- analysis of the water of the Holy Well, a medicinal spring at Humphry Head, North Lancashire, **21**, 19.
- Thorpe and Kekulé. See Kekulé.
- Thorpe, T. E., and E. H. Morton, water of the Irish Sea, **24**, 506.
- Thorpe, T. E., and J. Young, production of olefines from paraffin by distillation under pressure, **24**, 342.
- action of heat and pressure on paraffins, **25**, 802.
- Thudichum, J. L. W., acetic and formic acids obtained from human urine during the chemical decomposition of urochrome, **23**, 400.
- putrefaction of bile and the analysis and theory of gall-stones, **14**, 114.
- gall-stones, **16**, 34.
- cryptophanic acid, the normal free acid of human urine, **23**, 116.
- leucic acid and some of its salts, **14**, 307.
- leucimide, a decomposition-product of the albuminous substances, and of leucine, **23**, 409.

- Thudichum, J. L. W., researches on the physiological variations of the quantity of hippuric acid in human urine, **17**, 55.
- Thudichum and Wanklyn, note on Dumas' method of determining nitrogen, **22**, 293.
- note on oxalate of silver, **22**, 292.
- researches on the constitution and reactions of tyrosine, **22**, 277.
- Tiechborne, C. R. C., report on molecular dissociation by heat, of compounds in solution, **25**, 120.
- Tiegel, E., fermentative action of the blood, **25**, 1104.
- Tilden, W. A., chrysammic acid and chrysammates, **25**, 488.
- crystalline principle of Barbadoes aloes, **25**, 204.
- action of nitric acid upon Natal aloes, **25**, 153.
- periodides of some of the organic bases, **18**, 99; **19**, 145.
- Tilley, T. G., conversion of cane-sugar into a substance isomeric with cellulose and inulin, **11**, 384.
- some of the products of the action of nitric acid on castor-oil, **1**, 1.
- Timiraesef, new method of spectral analysis, **25**, 1113.
- Tissandier, G., new method of producing the anhydrous protoxide of iron, **25**, 285.
- analysis and composition of various manufacturing products, **24**, 762.
- Toezinski, F., platinoeyanides and tartrates of beryllium, **24**, 1013.
- Tollens, B., allyl-alcohol cyanide, **25**, 1092.
- boiling point and atomic volume of allyl alcohol, **24**, 346.
- conversion of allyl alcohol into acrylic acid, **24**, 1039.
- transformation of allyl alcohol into normal propyl alcohol, **25**, 998.
- determination of chlorine, bromine, and iodine by Carius's method, **25**, 1039.
- monoallylin and glycerin ether, **25**, 398.
- parabanic acid, **25**, 423.
- Tollens and Caspary. See Caspary.
- Tollens and Munder. See Munder.
- Tollens and Rinne. See Rinne.
- Tomlinson, C., catharism, or the influence of chemically clean surfaces, **22**, 125.
- action of low temperatures on supersaturated solutions of Glauber's salt, **25**, 284.
- behaviour of supersaturated saline solutions when exposed to the open air, **25**, 218.
- Tomlinson, C., and G. van de Mensbrugghe, relation between the surface-tension of liquids and the supersaturation of saline solutions, **25**, 784.
- Tommasi, D., action of lead iodide on some metallic acetates, **25**, 242.
- Tookey, C., manipulation of assays of gold and silver bullion, **23**, 366.
- separation of tin from antimony, and the analysis of alloys containing lead, tin, antimony, and copper, **15**, 462.
- Towle's process for electroplating the interior of metal pipes, **24**, 867.
- Traube, some combinations of chromium, **1**, 391.
- Trécul, A., origin of lactic and alcoholic ferments, **25**, 259.
- on cells of yeast becoming mobile, like monads, **25**, 260.
- Treskin, physiology of the bladder and kidneys, **25**, 633.
- Trentler, C., water-holding power of soil and soil-constituents, **25**, 522.
- Tribe, A., freezing of water and bismuth, **21**, 71.
- Tribe and Gladstone. See Gladstone.
- Trommer's test for sugar, **14**, 302; **25**, 1122.
- Troost and Hautefeuille, spectra of carbon, boron, silicon, titanium, and zirconium, **24**, 1147.
- heat-phenomena accompanying the transformation of nitrogen tetroxide into nitric acid, and the introduction of these bodies into organic compounds, **24**, 871.
- action of heat on the oxychlorides of silicon, **25**, 221.
- subchlorides and oxychlorides of silicon, **24**, 998.
- apparent volatilisation of silicon and boron, **24**, 997.
- Trowbridge, J., electric condition of a gas-flame, **25**, 976.
- Tschaikowsky, a new hexylene, **25**, 1087.
- Tuchschnid, C., influence of temperature on the molecular rotatory power of some polarising substances, **25**, 970.
- Tuchschnid and Follenius, solubility of carbon bisulphide in alcohol, **24**, 800.
- Tunner, P., on Danks's puddling furnace, **25**, 1134.
- observations on the temperatures at different parts of a blast furnace, **22**, 806.

- Tuson, R. V., note on the alkaloid contained in the seeds of the *Ricinus communis*, or castor-oil plant, **17**, 195.
 — digestion of mineral substances by animals, **25**, 1107.

U.

- Ulbricht and Birker. See Birker.
 Ulex, G. L., a native borate, **3**, 73.
 — struvite, **III**, 106.
 Ullgren, C., estimation of indigotin, or the blue colouring matter of indigo, **18**, 217.
 Unger, B., contributions to the chemical history of antimony, **25**, 41.
 Urbain and Matthieu. See Matthieu.
 Urban, A., distribution of diastase in malt, **25**, 1110.
 Ure, A., successive strengths of pyroxylic spirit, corresponding with its successive specific gravities, **1**, 36.
 von Usler and Limpricht. See Limpricht.

V.

- Valson, C. A., relation between capillary action and density in saline solutions, **25**, 212.
 — change of volume accompanying solution, **25**, 217.
 — densities of saline solutions, **24**, 987.
 Valson and Favre. See Favre.
 Varley, C., polarisation of metallic surfaces in aqueous solutions, **24**, 101.
 Varrentrapp and Will's apparatus for the estimation of nitrogen, modification of, by W. De la Rue, **III**, 347.
 — — apparatus for the estimation of nitrogen, improved form of, by T. Taylor, **III**, 318.
 Vaux, F., ultimate analysis of some varieties of coal, **1**, 318.
 Versmann, F., chloral hydrate and chloral alcoholate, **24**, 253.
 — valuation of chloral hydrate, **24**, 761.
 Vial, E., new method of printing upon stuffs by means of metallic precipitation, **25**, 855.
 Vierordt, R., quantitative determination of colouring matter by spectrum analysis, **24**, 759.
 — spectroscopic examination of colouring matters, **24**, 602.

- Violette, H., note on the detonating mixture of potassium nitrate and sodium acetate, **25**, 267.
 Vivien, A., analysis of molasses, **24**, 762.
 Voelckel, C., preparation of pure acetic acid from wood-vinegar and brandy-vinegar, **5**, 274.
 Voelcker, A., composition and agricultural value of earth-closet manure, **25**, 523.
 — field experiments on potatoes, **25**, 912.
 — composition and nutritive value of the prickly comfrey, **24**, 1082.
 — composition of Purton saline water, **14**, 46.
 — field experiments on root-crops, **24**, 1083.
 — productive powers of soils in relation to loss of plant-food by drainage, **24**, 276.
 — sugar-beets and beet-root distillation, **24**, 433.
 Vogel, A., alkaline reaction of silver oxide and silver nitrate, **24**, 109.
 — fatty constituent of beer-yeast, **24**, 942.
 — germination of seeds, **24**, 748.
 — influence of germination on the amount of fat in seeds, **25**, 317.
 — humate of ammonia, **24**, 749.
 — amount of nitrogen in black tea, **25**, 1034.
 — organic matter in building rubbish, **25**, 271.
 — silver acetate from a photographic silver-bath, **25**, 271.
 — decomposition of silver iodide, **24**, 313.
 — reduction of chloride and iodide of silver by hydrogen, **24**, 1009.
 — ammonia in snow-water, **25**, 980.
 — action of dilute sulphuric acid on starch, **24**, 226.
 Vogel, A., jun., action of certain reagents upon quinine, **3**, 191.
 Vogel, H., action of light on red prussiate of potash, **24**, 303.
 — photographic copying with carbonate of ammonia, **24**, 867.
 — the invisible photographic image, **25**, 31.
 — the spectrum of lightning, **25**, 118.
 — spectrum of the aurora borealis, **25**, 1061.
 Vogelsang, H., a remarkable well, **24**, 328.
 Vogt and Girard. See Girard.
 Vogt, G., and A. Henninger, on the synthesis of orein, and on some sulphur derivatives of toluene, **25**, 621, 1096.

- Vohl, H., compounds of aniline and toluidine with metallic iodides, **25**, 249.
- apparatus for the extraction of oil from seeds, **24**, 868.
- potash in soft soap and its adulterations, **25**, 934.
- composition of Rhine water near Köln, **24**, 213.
- preparation of very high grade superphosphate from the Mejillones guano, **25**, 849.
- analysis of a so-called universal manure, **24**, 854.
- valuation of oil-seeds, **24**, 761, 958.
- Vohl, H., and H. Eulenberg, physiological action of tobacco when used as a narcotic, with especial reference to the constituents of tobacco-smoke, **24**, 1075.
- Voit, C., some compounds of benzoyl, **9**, 268.
- Voit, K., tissue-change in phosphorus poisoning, **24**, 946.
- utilisation of certain inorganic constituents in the animal body, **24**, 1072.
- Vollard, J., decomposition of cyanogen by hydrochloric acid in alcoholic solution, **24**, 388.
- Vollrath, A., allyl sulphocyanate, a constituent of the root of mignonette, **25**, 172.
- De Vrij, J. E., application of molecular rotation to the valuation of cinchona barks, **24**, 857.
- formation of quinidine from quinoïdine, **25**, 721.
- separation and quantitative determination of the different cinchona alkaloids, **25**, 332.
- Vulpis, G., formation of corrosive sublimate in mixtures containing calomel, **25**, 850.
- W.**
- Waage, P., use of bromine in chemical analysis, **24**, 951.
- Wagner, A., estimation of nitric acid, **24**, 753; **25**, 323.
- determination of the temporary hardness of waters, **25**, 323.
- Wagner P., condition of the phosphoric acid in soils, **25**, 838.
- water-culture experiments with maize, **24**, 1081.
- Wagner, R., the Chile saltpetre and iodine industry of Tarapaca, **25**, 1131.
- Wagner, R., technology of the tannins, **25**, 1144.
- Waitz, E., volumetric determination of arsenic, **24**, 953.
- Waldie, D., new mineral from Burmah, **24**, 114.
- Walenn, W. H., solutions for electro-deposition of copper and brass, **24**, 103.
- Walker, J. F., benzyl-ethyl-benzene, **25**, 1004.
- Walker, J. F., and H. Zincke, a third nitriline, **25**, 418.
- Wallace, W., bone-charcoal of sugar refineries, **24**, 868.
- chemistry of sugar refining, **22**, 100.
- red prussiate of potash, **7**, 77.
- Wallach, O., action of some amido-compounds on chloral, **25**, 611.
- action of chloral on aniline, **24**, 931.
- Wallach and Wichelhaus, nitration of β -naphitol, **24**, 355.
- von Waltenhofen, new thermo-electric battery of great power, **24**, 989.
- Walters, W., monochlorinated ethyl chloride, **24**, 923.
- Walz, J., reduction of sulphuric acid by zinc-amalgam, **24**, 487.
- Wanklyn, J. A., salts of acetylinated ethyl, a new class of derivatives of the ethyl series, **23**, 14.
- note on the boiling points of isomeric ethers of the formula $C_nH_{2n}O_2$, **18**, 30.
- cadmium-ethyl, **9**, 193.
- constitution of carbonic oxide, **19**, 15.
- action of carbonic oxide on sodium-ethyl, **19**, 13.
- curious example of etherification, **17**, 367.
- new methods of analysing ethers, **25**, 1120.
- nature of the compound ethers, **17**, 401.
- titration of compound ethers, **20**, 170.
- fundamental difference between the structure of albumin and that of casein, **24**, 837.
- testing of commercial iodine, **25**, 1115.
- analysis of milk, **24**, 165.
- milk analysis by the ammonia process, **25**, 1044.
- new method of forming organo-metallic bodies, **19**, 128.
- oxidation-products of the propione produced from carbonic oxide and sodium-ethyl, **19**, 326.
- new mode of preparing propionio

- acid, viz., by the action of carbonic acid on an ethyl compound, **10**, 103.
- Wanklyn, J. A., atomicity of sodium, **22**, 199.
- action of sodium on valerianate of ethyl, viz., the liberation of the acid-forming radical, valeryl, **17**, 371.
- action of sulphhydrate of potassium on acetic ether, **17**, 418.
- composition of urine, **25**, 315.
- vapour-densities, **18**, 89.
- verification of Wanklyn, Chapman, and Smith's method of water-analysis on a series of artificial waters, **20**, 595.
- zinc-methyl, **13**, 124.
- Wanklyn and Buckeisen, action of sodium on methyl iodide mixed with ether, **13**, 140.
- Wanklyn and Chapman, oxidation of ethyl-amine, **19**, 320.
- — magnesium, **19**, 141.
- — action of oxidising agents on organic compounds in presence of alkali. Part I. Ammonia evolved by alkaline permanganate acting on organic nitrogen compounds, **21**, 161.
- Wanklyn, Chapman, and Smith, note on Frankland and Armstrong's memoir on the analysis of potable waters, **21**, 152.
- — — water-analysis: determination of the nitrogenous organic matter, **20**, 445.
- Wanklyn and Erlenmeyer. See Erlenmeyer.
- Wanklyn and Gamgee, action of permanganate of potash on urea, ammonia, and acetamide in strongly alkaline solutions, **21**, 25.
- Wanklyn and Playfair. See Playfair.
- Wanklyn and Schenk, synthesis of caproic acid, **21**, 31.
- Wanklyn and von Than, action of metals on iodide of ethylene, **12**, 258.
- Wanklyn and Thudichum. See Thudichum.
- Warburton, H., precipitation of the colouring matter of sugar by a metallic oxide, **3**, 55.
- Ward, W. S., balance galvanometer, **2**, 26.
- Ward and Frankland. See Frankland.
- Warrington, R., action of alkalis on wax, **1**, 248.
- action of animal charcoal, **11**, 326.
- notice of observations on the adjustment between the animal and vegetable kingdoms by which the vital functions of both are permanently maintained, **3**, 52.
- Warrington, R., curious change in the composition of bones taken from guano, **11**, 223.
- change of colour in the biniodide of mercury, **1**, 85.
- action of chromate of potash on the protosulphate of manganese, **1**, 30 (p).
- preparation of chromic acid, **1**, 17 (p).
- employment of chromic acid as an agent in voltaic arrangements, **1**, 61.
- curious form of crystallisation of potassium iodide, **5**, 136.
- means of preserving the crystals of salts as permanent objects for microscopic investigation, **11**, 71.
- the distilled waters of our pharmacopœias, **11**, 261.
- on Mr. Drayton's new method of covering glass by precipitation with a coating of metallic silver, **11**, 128.
- peculiar efflorescence of the chloride of potassium, **8**, 70.
- refining gold when alloyed with tin or antimony, so as to render it fit for the purposes of coinage, **13**, 31.
- on some commercial specimens of green glass, **11**, 247.
- method of detecting qualitatively small quantities of copper in solution, **5**, 137.
- red oxalate of chromium and potassium, **1**, 93.
- preparation of Prussian blue, **1**, 117.
- formation of Prussian blue upon the surface of gravel through the medium of ferrocyanide of calcium, **1**, 47 (p).
- re-arrangement of the molecules of a body after solidification, **1**, 77.
- mode of reducing the indications of the saccharometer and hydrometer to each other, **1**, 16 (p).
- curious change in the molecular structure of silver, **11**, 47.
- modification of the ordinary process of sublimation in a straight tube, **5**, 141.
- observations on the teas of commerce, **4**, 156.
- the green teas of commerce, **11**, 73; **5**, 139.
- means of testing the comparative value of astringent substances for the purposes of tanning, **111**, 319.
- obituary notice of, **21**, xxxi.

- Warington, R., jun., action of ferri-
cyanide of potassium on ferric salts,
18, 27.
- presence of manganese in oolite
and lias, **18**, 206.
- observations on manures, &c., **24**,
296.
- part taken by oxide of iron and
alumina in the absorptive action of
soils, **21**, 1.
- researches on the phosphates of
calcium, and upon the solubility of tri-
calcic phosphate, **19**, 296.
- estimation of phosphoric acid in
superphosphates, **24**, 584.
- quantitative determination of phos-
phoric acid by salts of magnesia, **16**,
304.
- solubility of bone-ash phosphates
in carbonic water, **24**, 80.
- solubility of magnesia in alkaline
salts, **18**, 27.
- Warren, T., estimation of zinc in gal-
vanised iron, **24**, 161.
- Wartha, V., direct oxidation of anthra-
quinone by potassium hydrate, **25**, 484.
- remarks on Ballo's supposed hy-
drate of carbon bisulphide, **24**, 307.
- convenient apparatus for evolving
gases, **25**, 785.
- mixing of hydraulic lime, **25**, 528.
- lecture experiments; reversed
flames, **24**, 187.
- solvents for indigotin, **24**, 568.
- decrease and increase of weight
produced by successive oxidation and
reduction; burning of magnesium in
carbon dioxide, **24**, 188.
- Watt, A., note on dichlorhydrin, **25**,
612.
- Watts, H., analysis of hop-ash, **11**, 392.
- quantitative separation of mag-
nesia and of the oxides of nickel,
cobalt, and zinc from potash and
soda, **2**, 99.
- phospho-cerite, a new mineral con-
taining phosphate of cerium, with
observations on the separation of
cerium, lanthanum, and didymium,
2, 131.
- Watts, J., strength of solutions of phos-
phoric acid of various densities, **19**,
499.
- Watts, W. M., spectra of carbon, **24**,
97.
- absorption of mixed gases in water,
17, 88.
- Way, J. T., spathic carbonate of iron,
11, 105.
- deposits of soluble or gelatinous
silica in the lower beds of the chalk
formation, **6**, 102.
- Weber, H. F., specific heat of carbon,
25, 592.
- Weber, R., estimation of magnesia by
phosphate of soda, and of phosphoric
acid by magnesia, **1**, 186.
- nitric anhydride and a new nitric
hydrate, **25**, 1072.
- compound of sulphuric acid with
nitric acid, **24**, 656.
- Websky, obtuse rhombohedrons and
hemiscalenohedrons in quartz-crystals
from Striegau in Silesia, **25**, 55.
- Weddige, A., action of potassium
sulphhydrate on benzoyl chloride, **24**,
900.
- Weidel, H., new base from extract of
meat, **24**, 716.
- Weigelin, F., alkaloids of *sabadilla*
seeds, **25**, 828.
- Weigelt, C., aëration of must, **24**, 158.
- Weil, F., process for the volumetric
estimation of copper and of sugar,
25, 1121.
- Weinhold, A., reversal of the sodium
line, **24**, 185.
- Weiske-Proskan, H., influence of the
addition of calcium phosphate to the
food on the composition of the ash of
milk, **25**, 837.
- digestion of cellulose by pigs, **25**,
1036.
- composition of some food-stuffs,
25, 840.
- influence of food containing little
or no phosphoric acid on the composi-
tion of bones, **25**, 1106.
- influence of different earthy phos-
phates mixed with the food on the
composition of the bones, **25**, 897.
- composition of goat's urine on
purely vegetable and purely animal
diet, **25**, 898.
- quantity and composition of the
stubble and roots remaining in the
field after harvest, **25**, 262.
- Weiss, S., relation of glycogen to mus-
cular activity, **25**, 156.
- Weith and Merz. See Merz.
- Weldon, W., separation of sulphur
from sulphuretted hydrogen, **25**,
1129.
- Weltzien, Karl, obituary notice of,
24, 622.
- Wenzell, W., abietene, a new hydro-
carbon, **25**, 392.
- Wernekinck, C., action of bone-char-
coal in sugar-making, **25**, 529.
- Wernicke, W., peroxides prepared by
electrolysis, **24**, 306.
- refraction and dispersion of light
in silver iodide, bromide, and chloride,
24, 653.

- Weselsky, P., new acid from aloes, **25**, 489.
 — double cyanides, **24**, 389.
 — mononitroresorcin, **25**, 1007.
 — azocompounds of resorcin, **24**, 830.
 — derivatives of resorcin, **24**, 227.
 Weselsky and Hlasiwetz. See Hlasiwetz.
 West, W., obituary notice of, **5**, 158.
 Westphal's process of dying black and loading of silk, **24**, 971.
 Wetherill, C. H., existence of the (so-called) compound ammonium amalgams, **24**, 491.
 — neutral sulphate of ethyl and its products of decomposition with water, **1**, 397.
 Wheeler, J. L. and L., on a coal-gas carbon and nitric acid voltaic battery, **9**, 198.
 Whipple, G., obituary notice of, **25**, 358.
 White's process for the manufacture of gases, **5**, 44.
 Wibel, F., gold from Vancouver's Island, **24**, 203.
 — analysis of a sub-fossilised human thigh-bone, **24**, 424.
 Wibel and Tüngel, formation of azurite, **24**, 201.
 Wichelhaus, H., acetyl-derivatives of ammonia, **24**, 407.
 — oxidation of phenol, **25**, 482.
 Widemann, G., preparation of barium chlorate, **25**, 599.
 — improved process for extracting silver and gold from arsenio-sulphides of lead, copper, &c., **24**, 447.
 Wieland, Th., sulphopyrotartaric acid, **24**, 132.
 Wieser, H., analysis of devitrified glass, **25**, 986.
 — analysis of efflorescences from Lago d'Ansato, **24**, 1177.
 — felspar from Blansko in Moravia, **24**, 1177.
 — kieserite from the Hallstatter Salzberg, **24**, 1179.
 — analysis of silicious calamine, from Scharley in Upper Silesia, **24**, 1178.
 Wiesner, J., increase of temperature during germination, **25**, 907.
 — detection of wood-pulp in paper, **24**, 969.
 Will, H., action of iodine on the oils of anise and fennel, **1**, 404.
 — new constituent of white mustard-seed, **24**, 408.
 — some compounds of hydrosulphate of mustard-oil, **8**, 183.
 Will, H., inorganic constituents of plants, **11**, 170.
 — on M. Reiset's remarks on the estimation of nitrogen in organic compounds, **1**, 197.
 Will and Varrentrapp's apparatus for the estimation of nitrogen, improved form of, by T. Taylor, **111**, 318.
 — — apparatus for the estimation of nitrogen, modification of, by W. De la Rue, **111**, 347.
 Williams, C. G., acetanilide, **17**, 106.
 — chinoline and leucoline series, **16**, 375.
 — hydrocarbons produced by the destructive distillation of coal, **15**, 130.
 — formation of the iodides of the alcohol-radicals from Boghead naphtha, **15**, 359.
 — isoprene and caoutchou, **15**, 110.
 — volatile bases produced by destructive distillation of the bituminous shale of Dorsetshire, **7**, 97.
 Williams, C. P., solubility of some forms of calcium phosphate, **25**, 269.
 Williams, J., guaranine, **25**, 1101.
 — artificial preparation of urea, **21**, 63.
 Williams, R. Douglas, sulpho- and sulphonitro-dibromobenzene, **24**, 1055.
 Williams, S., chlorhydrated sulphuric acid, **22**, 304.
 Williams, W. C., oxychlorides of antimony, **25**, 122.
 — — determination of phosphoric acid, **23**, 383.
 Williams, W. M., description of an apparatus for collecting gases over water or mercury, **6**, 44.
 — burnt iron and burnt steel, **24**, 790.
 Williamson, A. W., atomic theory, **22**, 328.
 — — blue compounds of cyanogen and iron, **111**, 125.
 — classification of the elements in relation to their atomicities, **17**, 211.
 — etherification, **4**, 106, 229.
 — remarks on chemical nomenclature and notation, **17**, 421.
 — on Dr. Kolbe's additive formulae, **7**, 122.
 — decomposition of oxides and salts by chlorine, **11**, 234.
 — ozone, **11**, 395.
 — constitution of salts, **4**, 350.
 — note on the decomposition of sulphuric acid by pentachloride of phosphorus, **7**, 180.

- Williamson's theory of water, ethers, and acids, critical observations on, by H. Kolbe, **7**, 111.
- Williamson and Russell, new method of gas-analysis, **17**, 238.
- Williamson, R., compounds obtained by the action of anhydrous sulphuric acid on the chlorides of hydrogen and ethyl, **10**, 97.
- Wills, A. W., ethers intermediate between the cyanhylic and the methylic, ethylic, and amylic series, and on the constitution of castor-oil alcohol, **6**, 307.
- Wilm and Wischin, carbanilic ether, **21**, 192.
- Wilson, G., argument for the binary theory of salts, derived from the non-action of the anhydrous oxygen-acids on organic colours, **1**, 332.
- some phenomena of capillary attraction observed with chloroform, bisulphide of carbon, and other liquids, **1**, 174.
- detection of fluorine when accompanied by silica, **5**, 151.
- decomposition of water by platinum and black oxide of iron at a white heat, with some observations on the theory of Mr. Grove's experiments, **III**, 332.
- obituary notice of, **13**, 169.
- Wilson, J., solvent action of drainage water on soils, **III**, 219.
- Wilson, W., analysis of Berlin porcelain, **2**, 154.
- action of chloride of cyanogen upon toluidine, **3**, 154.
- Wimmel, Th., melting and solidifying points of fats, **24**, 476.
- Winkler, C., plating with aluminium, **25**, 1134.
- talmi-gold, **25**, 528.
- Winkles, G. H., existence of trimethylamine in the brine of salted herrings, **7**, 63.
- Winsor, W., obituary notice of, **21**, xxxiv.
- v. Wintsehgau, M., on Hofmann's tyrosine reaction, and on the compounds of tyrosine and mercury, **24**, 406.
- Wischin and Kolbe. See Kolbe.
- Wischin and Wilm. See Wilm.
- Wislicenus, J. B., iodopropionic acid, **24**, 235.
- Wislicenus and Brunner, benzene-disulphonic acid, **25**, 623.
- Witt, H. M., analysis of the ash of lemon-juice, **7**, 44.
- v. Wittich, physiology of human bile, **25**, 1105.
- v. Wittich, action of pepsin on the fibrin of blood, **25**, 630.
- Wittstein, G. C., occurrence of baryta in silicates, **24**, 674.
- contamination of iodine with iodine cyanide, **24**, 763.
- quantitative estimation of organic matter and nitric acid in potable waters, **24**, 754.
- Wittwer's photochemical experiments, **8**, 193.
- Woelz, A., dibromobenzene-sulphonic acid, **25**, 76.
- Wöhler, F., amidogen-compounds of tungsten, **3**, 171.
- action of acids on amygdalin, **1**, 398.
- nitride of boron, **3**, 167.
- cyanogen-compounds of titanium, **3**, 177.
- lecture experiments in illustration of gaseous diffusion, **24**, 186.
- meteoric iron of Ovikak, Greenland, **25**, 796.
- phosphide of tungsten, **5**, 94.
- some new compounds of tellurethyl, **6**, 40.
- reduction of thallium from the chloride, **25**, 880.
- thialdine and selenaldine, **III**, 303.
- titanium, **2**, 352.
- Wöhler and Buff. See Buff.
- Wöhler and Dean, telluromethyl, **8**, 164.
- Wöhler and Frerichs. See Frerichs.
- Wolf, E., assimilation of clover-hay and mangolds by sheep, **24**, 1074.
- digestion of clover, **25**, 913.
- Wolffberg, S., tension of the gases of the blood in the pulmonary capillaries, **25**, 311.
- Wolkoff, Anna, new amido-acids, **25**, 147.
- action of phosphorus pentachloride on certain aciamides, **25**, 413.
- action of β -toluene-sulphonic chloride on amides, **25**, 148.
- Wollaston, improvements in the instrument invented by, for ascertaining the refractive indices of bodies, **1**, 234.
- Wonfor, J., spontaneous decomposition of chloride of ammonia, **1**, 54 (p).
- Wonfor, W. J., complex cyanide of iron, copper, and potassium, **15**, 357.
- Wood, C. H., tests for chloral hydrate, **24**, 254.
- Wood, C. S., bases produced by nitrous substitution, **12**, 152.
- Woodcock, R. C., action of normal and acid salts on ammonium salts,

- especially on ammonium chloride, **24**, 785.
- Woods, Dr., determination of the amount of organic matter in drinking waters by means of a standard solution of permanganate of potash, **16**, 62.
- Worsley, P. J., remarks on Gurlt's process for the manufacture of iron, **10**, 151.
- Wortley, Col. Stuart, photographic process with silver bromide collodion, **25**, 1138.
- Wreden, F., amido-camphoric acid, **25**, 147.
- relations between atomic weights, **24**, 884.
- camphoric acid, **25**, 895.
- basicity of camphoric and meso-camphoric acid, **25**, 146.
- derivatives of camphoric acid, **24**, 548.
- reduction of isoxylene and of aromatic hydrocarbons in general, **25**, 893.
- Wright, A. W., action of ozone on vulcanised caoutchouc, **25**, 1072.
- simple apparatus for the production of ozone with electricity of high tension, **25**, 1071.
- Wright, C. R. A., specific gravity of aqueous hydriodic acid, **24**, 655.
- specific gravity of aqueous hydrobromic acid, **24**, 486.
- action of hydrobromic acid on codeine, **24**, 404.
- opium alkaloids, **24**, 932; **25**, 150, 504.
- practical loss of soda in the alkali manufacture, **20**, 407.
- Wright, C. R. A., and C. H. Piesse, oxidation-products of essential oil of orange-peel, **24**, 1186.
- Wright, R., contributions to the knowledge of the chemical action of sunlight on sensitive photographic papers, **19**, 33.
- Wrightson, F. C., analysis of some specimens of hot and cold blast iron, **1**, 330.
- Wroblewsky, E., decompositions of isomeric bromotoluidines, **24**, 713.
- dibromotoluene, **25**, 698.
- isomeric dibromotoluenes, **24**, 686.
- derivatives of metatoluidine, **24**, 563.
- derivatives of orthotoluidine, **24**, 1061.
- sulpho-acids from orthobromotoluene, **24**, 129.
- Wüllner, A., specific heat of aqueous solutions, **24**, 798.
- Wüllner, A., transformation of the spectra of incandescent gases due to changes of pressure and temperature, **24**, 483.
- on Peltier's phenomenon and the thermo-electric force of metals, **25**, 779.
- Wunder, G., stannic and titanio compounds crystallised from fluxes, **25**, 121.
- Wurster and Meyer. See Meyer.
- Wurtz, A., note on an aldehyde-alcohol, **25**, 808.
- butylic alcohol, **8**, 264.
- action of chlorine on aldehyde, **24**, 1056.
- decomposition of the cyanic ethers, **7**, 91.
- compounds of cyanuric and cyanic acid with the oxides of ethyl, methyl, and amyl, and the products resulting therefrom, viz., acetyl- and metacetylurea, and methylamine, ethylamine, and valeramine, **3**, 90.
- chloride of ethylene, **11**, 96.
- oxide of ethylene considered as a link between organic and mineral chemistry, **15**, 387.
- formation of phenols from aromatic hydrocarbons, **25**, 481.
- Wurtz and Vogt, formation of chloral, **25**, 610.
- Wurtz and Wilm, purification of colza oil, **24**, 160.
- Wurtz, H., origin of coal, **25**, 228.

Y.

- Yardley, H. B., note on the estimation of sulphur in pyrites, **25**, 842.
- Yorke, P., on a specimen of artificial arragonite, **1**, 9 (p).
- aurosulphides of sodium and potassium, **1**, 236.
- note on the quantity of cesium contained in the water of the hot spring found in Wheal Clifford, **25**, 273.
- notice of a specimen of chlorobromide of silver from Chili, **4**, 149.
- brown iron ore, **11**, 321.
- solubility of oxide of lead in pure water, **11**, 399.
- Young and Thorpe. See Thorpe.
- Yvon, determination of copper by potassium cyanide, **25**, 926.

Z.

- Zapolsky, N., behaviour of albuminous matters and ferments with phenol, **24**, 842.
- v. Zepharovich, V., atacamite crystals from South Australia, **24**, 1180.
- cerussite of Kirlibaba in Bukovina, **24**, 668.
- freislebenite and diaphorite, **24**, 667.
- Zervas, L., action of sulphuric acid on anisic acid, **10**, 211.
- Zettnow, E., barium chromate, **25**, 385.
- chromate of chromic oxychloride, **24**, 1170.
- preparation of crystallised chromium and of pure chromic acid, **25**, 45.
- specific gravity of pure chromic acid, and of chromic acid solutions, **25**, 46.
- preparation of collodion paper, **25**, 337.
- sensibility of collodion, as affected by the varying proportion of pyroxylin and iodising salts, **25**, 1137.
- method of quickly drying flasks, and adapting wide to narrow tubes, **25**, 527.
- preparation of pure hydrochloric acid from the impure fuming acid, **25**, 979.
- crystallised phosphoric acid, **25**, 786.
- compounds of sodium acetate with water, **24**, 230.
- Ziegler's method of estimating albumin, **25**, 129.
- Zincke, Th., new series of aromatic hydrocarbons, **24**, 508, 688.
- Zincke, Th., contributions to the history of the benzoïn series, **25**, 63.
- two modifications of benzophenone, **24**, 832.
- derivatives of benzyl-toluene, **25**, 1004.
- ditolyl, **24**, 510.
- Zincke and Franchimont. See Franchimont.
- Zincke and Kekulé. See Kekulé.
- Zincke and Popoff. See Popoff.
- Zincke and Walker. See Walker.
- Zinin, N., derivatives of deoxybenzoïn, **24**, 539.
- derivatives of lepidene, **25**, 295.
- action of zinc on benzyl tetra-chloride and other chlorine and bromine products, **24**, 1041.
- Zinin and Moldenhauer, compound urcas, **8**, 158.
- Zinno, S., iodosulphuric acid and iodosulphates, **24**, 1164.
- Zirkel, F., microscopic constitution of clay-slates and roofing slates, **25**, 294.
- Ziureek, disinfection of cesspools and street gutters, **24**, 971.
- Zoller, P., examination of a Himalaya tea, **24**, 571.
- nutritive and assimilative processes in fungi, **24**, 1205.
- Zorn, W., action of hydracids on the quinine alkaloids, **24**, 931.
- v. Zotta, V., phenol from glycerin, **25**, 61.
- v. Zotta and Linnemann. See Linnemann.
- Zuntz, N., is the compound of carbonic acid with hæmoglobin, a fixed compound? **25**, 899.
- Zwenger, chemical constitution of cholesterol, **1**, 418.

INDEX OF SUBJECTS.

A.

Abietene, **23**, 392.

Absorption of ammonium salts by hydrated ferric oxide and hydrate of alumina, **21**, **11**, **14**.

— of chemical rays by reflection from polished surfaces, **17**, **76**.

— of chemical rays by transmission through gases, **17**, **72**.

— of chemical rays by transmission through liquids, **17**, **71**.

— of chemical rays by transmission through solids, **17**, **62**.

— of chemical rays, discrimination of organic substances by the, **17**, **305**.

— of coloured rays by transmission through vapours, **17**, **72**.

— of gases by soils, **24**, **853**.

— of mixed gases in water, **17**, **88**.

— of phosphoric acid by soils, **21**, **2**.

— of light, connection of optical and chemical, **24**, **302**.

— of potassium-salts by hydrated ferric oxide and hydrate of alumina, **21**, **613**.

— of vapours by charcoal, **20**, **160**; **21**, **186**.

— of mixed vapours by charcoal, **22**, **73**.

Absorption and dialytic separation of gases by colloid septa, **20**, **235**.

Absorption and fluorescence, relation between, **25**, **1060**.

Absorption-bands of chlorophyll, **25**, **383**.

Absorption-spectra of chlorine and chloride of iodine, **25**, **462**.

— — produced by solutions of nitrogen tetroxide, chlorine tetroxide, and chlorine trioxide, **25**, **280**.

— — yielded by certain organic substances, **22**, **324**.

— — of the vapours of selenium, selenious chloride and bromide; of tellurium, tellurous chloride and bromide; of iodine bromide; and of alizarin, **25**, **665**.

— — of the vapours of sulphur, selenious anhydride, and hypochlorous anhydride, **25**, **382**.

Absorption-spectrum of leaves, **25**, **164**.

— — of solid chlorophyll, **25**, **159**.

Absorptive action of soils, part taken by oxide of iron and alumina in the, **21**, **1**.

Acacia nilotica, ash-constituents of the seeds of, **24**, **429**.

Acenaphthene, conversion of ethylenenaphthalene into, **25**, **700**.

— vapour-density of, **25**, **295**.

Acetal, derivatives of, **25**, **406**.

Acetal-chloral hydrate, vapour-density of, **24**, **707**.

Acetaldehyde, **9**, **188**.

Acetaldehyde-ammonia, vapour-density of, **26**, **707**.

Acetamide, action of permanganate of potassium on, **21**, **30**.

— (benzyl-), **25**, **1027**.

— -chloral, **25**, **611**.

Acetamide and acetonitrile, action of sulphuric acid on, **9**, **243**.

Acetanilide, **17**, **106**.

Acetate of allyl, **10**, **322**.

— of alumina, **6**, **246**.

— — as a mordant, **16**, **408**.

— of amyl, normal, **24**, **1034**.

— — oxidation of, **19**, **485**.

— of barium, diffusion of, **4**, **91**.

— biamidobenzoic acid, **9**, **273**.

— capryl, **7**, **288**.

— of ethyl, capillary transpiration of, **15**, **439**.

— — action of sodium and isopropyl iodide on, **20**, **102**.

— — oxidation of, **19**, **484**.

— ferric, **6**, **228**.

— of heptyl, **16**, **218**.

— of lead, action of basic and neutral, on solutions of sugar, **14**, **29**.

— — action of bromine on, **22**, **485**.

— — diffusion of, **4**, **91**.

— of methyl, absorption of the vapour of, by charcoal, **21**, **188**.

— — oxidation of, **15**, **485**.

— — preparation of, **21**, **480**, **484**.

— — vapour-tension of, **21**, **481**, **487**.

— of phenyl, **7**, **241**.

Acetate of phenyl, formation of, by the action of bisulphide of carbon on a mixture of acetate of lead and phenylic alcohol, **18**, 24.

Acetate of potassium, diffusion of, in alcohol, **15**, 228.

— action of bromine on, **22**, 186.

— action of chlorine on, in aqueous solution, **22**, 187.

— action of chloropierin and chloroform on, **18**, 31.

— electrolysis of, **24**, 916.

— reaction of, with nitrate of ethyl, **20**, 584.

Acetate propylic, normal, **24**, 1032.

— of silver, **1**, 24.

— from a photographic silver-bath, **25**, 271.

Acetate of sodium, compounds of, with water, **24**, 230.

— of stibtriethyl, **9**, 281.

— of sycoeceryl, **15**, 67.

— of thallium, **17**, 149; **25**, 988.

— of tolylene, **25**, 817.

— of uranium and cobalt, **25**, 401.

— of uranium and copper, **25**, 401.

Acetate and butyrate of calcium, distillation-products of a mixture of, **24**, 385.

Acetates, alkaline, preparation of dimethyl by electrolysis of, **21**, 502.

Acetates, metallic, action of lead iodide on, **25**, 242.

Acetates and bromacetates of methyl, ethyl, and amyl: relationship between their boiling points, **11**, 27.

Acetanyl-benzene, **25**, 440.

Acetic acid, absorption of the vapour of by charcoal, **18**, 290.

— acid isomeric with, produced by the action of nascent hydrogen on oxalic acid, **16**, 303.

— action of bromine on, **11**, 22.

— action of nitric ether on, **22**, 188.

— action of, on phenyl sulphocyanate, **24**, 140.

— action of liquid phosphene on, **24**, 338.

— capillary transpiration of, **15**, 433.

— crystallisation of, **22**, 149.

— diffusion of, **4**, 88.

— electrolysis of the substitution-derivatives of, **24**, 701; **25**, 484.

— estimation of, in lead acetate, **24**, 442.

— formation of, by alcoholic fermentation, **25**, 574.

— formation of, by oxidation of acetylene, **25**, 142.

Acetic acid, formation of, by oxidation of anylene, **19**, 491.

— formation of, by oxidation of amyllic acetate, **19**, 485.

— formation of, by oxidation of amyllic alcohol, **19**, 333.

— formation of, by oxidation of ethylamine, **19**, 487.

— formation of, by oxidation of ethylamylamine, **19**, 489.

— formation of, by oxidation of ethylic acetate, **19**, 484.

— formation of, by oxidation of ethylic iodide, **19**, 486.

— formation of, by oxidation of ethylic nitrate, **19**, 486.

— formation of, by oxidation of 6-hexylene, **19**, 492.

— formation of, by oxidation of isopropylic iodide, **19**, 487.

— formation of, by oxidation of oleic acid, **11**, 239.

— formation of, by oxidation of essential oil of orange peel, **24**, 1187.

— obtained from human urine during the decomposition of urochrome, **23**, 400.

— heat evolved in the neutralisation of, by potash, **11**, 65.

— osmose of, **8**, 59.

— preparation of pure, from wood-vinegar and brandy-vinegar, **5**, 274.

— vapour-density of, **15**, 153.

Acetic acid, anhydrous, **5**, 130, 228.

— anhydrous sulphuretted, **7**, 189.

Acetic acid, aqueous, composition of, **11**, 173.

— aqueous, of constant boiling-point, **15**, 273.

Acetic acid, glacial, determination of, **24**, 1093.

— glacial, reaction of, with nitrite of amyl, **20**, 578.

Acetic acid, sulphuretted, **7**, 189.

Acetic acid and alcohol, relation between, **4**, 237.

Acetic acid and alcohol, action of, on indigo-blue, **19**, 464.

Acetic acid and glycerin, compounds of, **6**, 286.

— and pyroracemic acid, action of zinc on a mixture of, **16**, 262.

Acetic anhydride, action of, on carbohy-drates and allied substances, **25**, 66.

— action of barium peroxide on, **21**, 497.

— action of, on the hydrides of salicyl, ethyl-salicyl, &c., **20**, 586.

— action of, on stannic oxide, **25**, 813.

- Acetic anhydride, formation of, by the action of bisulphide of carbon on acetate of lead or silver, **18**, 22.
- — — compound of, with hydride of aceto-salicyl, **21**, 183.
- — — compound of, with hydride of butyro-salicyl, **21**, 473.
- — — brominated, derivatives of, **24**, 231.
- Acetic benzoate, or benzoic acetate, **5**, 227.
- Acetic chloride, **5**, 226.
- Acetic cuminate, or cuminic acetate, **5**, 227.
- Acetic ether, absorption of vapour of, by charcoal, **20**, 163.
- — — action of sodium amalgam on hydriodic acid, in presence of, **16**, 423.
- — — action of sodium amalgam on the iodides of methyl, ethyl, amyl and hexyl, in presence of, **16**, 416.
- — — action of sodium and ethylic iodide upon, **19**, 396.
- — — action of sulphhydrate of potassium on, **17**, 418.
- — — synthesis of ethers from, **19**, 395.
- Acetic ether, sulphuretted, **7**, 190.
- Acetic ether, tetrachlorinated, formation of, by the action of acetyl chloride on chloral hydrate, **25**, 246.
- Acetic ether, tribasic, **24**, 515.
- Acetic ethers of dulcite, **25**, 400.
- Acetic series of acids, relation of the acrylic series to, **18**, 152.
- — — formulae of compounds belonging to the, **13**, 344.
- Acetidin, **6**, 286.
- Acetin, **6**, 286.
- Acetobenzidine, **25**, 503.
- Acetobenzotartaric ether, **20**, 145.
- Acetobromophenone, **24**, 258.
- Acetochloral, preparation of, from aldehyde, **24**, 384.
- Acetonitrilamide, and some of its derivatives, **25**, 81.
- Acetone, absorption of the vapour of, by charcoal, **20**, 163; **21**, 192.
- — — action of mercuric chloride on, **24**, 561.
- — — action of liquid phosgene on, **24**, 342.
- — — capillary transpiration of, **15**, 440.
- — — conversion of, into hydride of hexylene, **25**, 409.
- — — conversion of, into lactic acid, **24**, 919.
- — — formation of, by oxidation of isopropyl alcohol and of pinacone with chromic anhydride, **25**, 143.
- — — relation of, to pseudopropylic alcohol, **19**, 260.
- Acetone and alcohol, action of hydrochloric acid upon a mixture of, **7**, 426.
- Acetone, diethylated, **19**, 402.
- — — dimethylated, **19**, 414.
- — — ethylated, **19**, 405.
- — — methylated, **19**, 406.
- Acetone-sulphonic acid, **24**, 702.
- Acetonitrile, preparation of, **9**, 242.
- Acetophenone, derivatives of, **24**, 258.
- Acetopiperidine-compounds, **24**, 147.
- Aceto-propionic acid, **5**, 4.
- Aceto-salicyl, hydride of, **21**, 181.
- Aceto-tartaric ether, **20**, 146.
- Acetohide (nitro-ortho), **24**, 563.
- Acetoxybenzamates, metallic, **13**, 240.
- Acetoxybenzamic acid, an isomeride of hippuric acid, **13**, 235.
- — —, relation of, to oxybenzamic acid, **13**, 243.
- Acetureid, **8**, 159.
- Acetyl chloride, action of, on benzo-tartaric ether, **20**, 144.
- — — action of sulphuric acid on, **24**, 125.
- — — action of, on tartaric acid, **20**, 149.
- — — action of, on tartaric ether, **20**, 145.
- — — conversion of, into ethyl alcohol, **24**, 228.
- Acetyl diethyltartrate, **20**, 155.
- Acetyl peroxide, **17**, 272.
- Acetyl-ammonium oxide, **8**, 150.
- Acetyl-ammonium sulphate, **8**, 152.
- Acetyl-benzene alcohol, **24**, 223.
- Acetyl-chloral alcoholate, **25**, 246.
- Acetyl-chloresteryl, **25**, 808.
- Acetyl-derivatives of ammonia, **24**, 407.
- Acetyl-derivatives of carbo-hydrates, of mannite and its isomerides, and of certain other vegetable products, **25**, 66.
- Acetylene, conversion of, into ethylene, **17**, 38.
- — — constitution of, **25**, 231.
- — — formation of, by direct combination of carbon and hydrogen, **17**, 37.
- — — modification of Berthelot's experiment for the formation of, by imperfect combustion, **19**, 151.
- — — oxidation of, to acetic acid, **25**, 142.
- Acetylene chlorides, **25**, 996.
- Acetylene dihydrobromide, **25**, 683.
- Acetylene series of hydrocarbons, **25**, 435.
- Acetyl-ethyl dibenzoin, **24**, 536.
- Acetyl-gallie ether, **25**, 820.
- Acetylde of copper, action of ethylene iodide on, **24**, 903.
- Acetylated ethyl, salts of, **23**, 14.
- Acetyl-oxamate, ethylic, **25**, 1091.
- Acetyl-saccharose, **25**, 69.
- Acetyl-urea, **3**, 90, 91, 93; **8**, 159.

- Aciamides, action of phosphorus pentachloride on, **25**, 413.
- Acid, means of removing the, from stored wines, **1**, 413.
- Acid and sugar, changes in the proportion of, in grapes, during the process of ripening, **20**, 378.
- Acidity of the air at Manchester and other localities, **11**, 209.
- Acids, action of, on amygdalin, **1**, 398.
- action of, on metals and alloys, **19**, 434.
- action of, on spathic carbonate of iron, **11**, 106.
- action of, on starch, **25**, 581.
- action of certain liquids in retarding the action of, on metals, **25**, 116.
- capillary transpiration of, **15**, 410.
- conversion of monocarbonic, into dicarbonic acids, **17**, 109.
- action of, on naphthylamine, **19**, 329.
- compounds of glycerin with, **6**, 280; **7**, 282.
- heat evolved in combination of, with anhydrous bases, **6**, 246.
- heat evolved in the neutralisation of various, by potash, **11**, 51—68.
- influence of, on the oxygen of hæmoglobin, **25**, 312.
- products of the action of, on castor-oil, **1**, 1.
- Acids, acrylic, names and formation of, **18**, 155.
- Acids, aqueous, of constant boiling-point, **13**, 146; **15**, 270.
- Acids, chlorinated, formation of, **24**, 551.
- Acids, diamidic, **12**, 105.
- Acids, diamine-diamidic, **12**, 104.
- Acids, diatomic and bibasic, monochlorides of, **24**, 820.
- Acids, fatty, constitution of, **19**, 429.
- — conversion of, into the corresponding alcohols, **24**, 227.
- — heat disengaged in combustion of, **6**, 237.
- — preparation of aldehydes from the, **9**, 187.
- — separation of, **3**, 82.
- — of castor oil, **1**, 80.
- — in the fusel-oil of Hungarian wine, **24**, 359.
- Acids, fixed fatty, compounds of glycerin with, **6**, 282.
- Acids, haloïd, action of, upon diazoamidobenzoic acid, **18**, 302.
- Acids, isomeric, $C_7H_6O_3$, iodised products of, **25**, 622.
- Acids of the lactic series, classification of, **22**, 62.
- proximate analysis of, **22**, 76.
- Acids of the lactic series, synthesis of, **22**, 28.
- — transformation of, into acids of the acrylic series, **18**, 133.
- Acids, mineral, compounds of glycerin with, **6**, 287.
- Acids of a mixed character, thermal effects of the combination of, with bases, **24**, 980.
- Acids, monobasic and bibasic, distinction between, **11**, 127.
- Acids, non-nitrogenous, resolution of, into glyceoll and cholic acid, **1**, 314.
- Acids in the oil of *Bassia latifolia*, **2**, 231.
- Acids in Bonnington water, **11**, 207.
- Acids produced by oxidation of fermentation butylic alcohol, **24**, 125.
- Acids produced by oxidation of sugar, **25**, 812.
- Acids, organic, formation of, from aldehydes, **17**, 47.
- — compounds of glycerin with various, **6**, 286.
- — law of basicity of, **22**, 62.
- — peroxides of the radicals of, **17**, 266.
- — synthesis of, **25**, 142.
- Acids, organic, anhydrous, **5**, 127, 226; **6**, 184.
- Acids, organic containing nitrogen, **11**, 79.
- Acids, organo-thionic, new series of, **10**, 55, 243.
- Acids, polyatomic, action of hydrobromic and hydriodic acids on, **17**, 203.
- Acids, quartary, monamide, **12**, 103.
- Acids, solid, volatile and fatty, of coconut oil, **1**, 404.
- Acids, sulphazotised, **24**, 307.
- Acids of sulphur, **1**, 75.
- Acids, sulphuretted, new series of, **7**, 188.
- Acids, tertiary, monamidic, **12**, 100.
- Acids, tribasic, synthesis of, **18**, 331.
- Acids, volatile, present in the distillate from Chinese wax and nitric acid, **10**, 177.
- — of the series $(CH)_nO_4$, physiological action of, **3**, 181.
- — fatty, compounds of glycerin with, **6**, 285.
- — organic, of the mountain-ash berry, **12**, 13.
- Acids and alkalis, reciprocal action of, in solution when separated by a porous diaphragm, **25**, 460.
- Acids and bases, circumstances tending to disguise the presence of various, in chemical analysis, **10**, 110.
- Acids and salts, constitution of, **17**, 1.
- Acids, water and ethers, Kolbe's observations on Williamson's theory of, **7**, 111.

- Acidulous chalybeate water from Melrose, **25**, 60.
- Acieration, **20**, 288.
- Aconite alkaloids, **25**, 305.
- Aconitic acid, formation of, by the action of hydracids on citric acid. **24**, 1048.
- Aconitine, crystallised, physiological action of, **24**, 948.
- preparation and properties of, **24**, 941.
- Acorns, analysis of the ash of, **9**, 46.
- Acorus calamus*, essential oil from the rhizome of, **25**, 1.
- Aceridine, **24**, 708.
- vapour-density and formula of, **25**, 295.
- Acetyl sulphocyanate, **24**, 408.
- Aerolein-ammonia, decomposition of, by dry distillation, **24**, 537.
- Aeryl compounds, **25**, 1002.
- Acrylic acid, **25**, 814.
- derivatives of, **25**, 689.
- formation of, from allyl alcohol, **24**, 1039.
- Acrylic acids: their relations to acids of the acetic series, **18**, 152.
- their relation to acids of the lactic series, **18**, 151.
- natural and artificial, relations between, **18**, 147.
- Acrylic ether, **25**, 814.
- Acrylic form of acids, extension of the, to the benzoic series, **18**, 154.
- Actino-chemistry, contributions to, **11**, 311.
- Active oxygen, effect of, upon pyrogallie acid, **25**, 703.
- Adamellogranite and the mica contained in it, **25**, 602.
- Additive compounds, aromatic, **25**, 1008.
- Adipic acid, formation of, by oxidation of phorone, **25**, 1011.
- Æschynite, composition of, **25**, 203.
- Æsculin, constitution of, **24**, 700, 960.
- Æsculin and pavin, distinction between, **11**, 18.
- Æthers. See Ethers.
- Æthogen. See Ethogen.
- Affinities, some cases of the formation of chemical compounds by insufficient, **25**, 392.
- Affinity, accessory, **111**, 356.
- Affinity, chemical, circumstances modifying the action of, **9**, 54.
- the phenomenon of, according to multiples of common constants, **25**, 457.
- researches on, **6**, 82.
- Agents, explosive, contributions to the history of, **23**, 41.
- Aggregation, influence of, on circular polarization, **13**, 259.
- Agricultural crops, amount of sulphur and phosphorus in various, **111**, 281.
- Agriculture, application of sewage to, **10**, 272.
- Air and ammonia, absorption of, in water, **16**, 90.
- Air, analysis of, **1**, 13 (p).
- by Williamson and Russell's apparatus, **17**, 254.
- composition of, **25**, 33.
- volumetric estimation of carbonic acid in the, **10**, 292.
- determination of the proportion of oxygen in, **4**, 221.
- dialytic separation of oxygen from, **20**, 243.
- effect of, in facilitating ebullition, **22**, 128, 143, 147, 151.
- effect of flowers on the, **20**, 25.
- electrification of, for the production of ozone, **24**, 994.
- organic matter contained in, **23**, 98.
- percolation of, through gutta-percha, and other septa, **20**, 257.
- Air of the Atlantic Ocean, analysis of, **20**, 190.
- amount of carbonic acid in, **20**, 196.
- Air in the barracks at Aargau, examination of, **25**, 515.
- Air from Mont Blanc, composition of, **13**, 22.
- Air over the Irish Sea, amount of carbonic acid in, **20**, 194.
- Air in the neighbourhood of graduation-houses for salt-evaporation, ozone reactions of, **25**, 384.
- Air, ozonous, influence of, upon organic matter, **16**, 153.
- Air of towns, **11**, 196.
- its effect on the blood, **11**, 224.
- its effect on stones, bricks, mortar, &c., **11**, 232.
- Air and water of towns, remarks on the, **111**, 311.
- Air-pump, method of obtaining a perfect vacuum in the receiver of an, **5**, 189.
- Air-pump (water), **25**, 1067.
- Ajwa, oil of, **8**, 289.
- "Al" root, the root of *Morinda citrifolia*, the best source of pure alizarin, **17**, 334.
- Alanine, **24**, 127.
- Alaria esculenta*, mannite in, **11**, 138.
- Albite, **24**, 506; **25**, 52.
- Albumin, action of arsenious acid on, **3**, 14.
- clean surface of, and its use in photography, **24**, 1151.
- compounds of arsenious acid with, **4**, 178.

- Albumin, decomposition of, by potassium permanganate, **25**, 252.
 — derivatives of, **24**, 409; **25**, 1028.
 — detection of, in urine, **24**, 1095.
 — dialysis of, **15**, 260.
 — diffusion of, **15**, 224.
 — distribution of, through muscular tissue, **17**, 405.
 — form of ferment to which it gives rise, **23**, 387.
 — preparation of, **25**, 1103.
 — volatile products of the decomposition of, by manganese peroxide, or by chromic and sulphuric acid, **1**, 82.
 — Ziegler's method of estimating, **25**, 129.
 Albumin (egg), estimation of, **25**, 814.
 — properties of, **24**, 572.
 Albumin from fish-roe, **24**, 968.
 Albumin and casein, fundamental difference between the structure of, **24**, 837.
 Albumin, casein, and fibrin, formation of leucine and tyrosine from, **2**, 364.
 Albuminoid ammonia, estimation of, **20**, 593.
 — quantity of, in different waters, **20**, 454.
 Albuminoid matters, conversion of, into urea by potassium permanganate, **25**, 157.
 Albuminoids and their changes during germination, **25**, 907.
 — decomposed in the body, excretion of the nitrogen of, **24**, 913.
 — behaviour of, with phenol, **24**, 812.
 — See also Proteids.
 Albuminose, **24**, 1071.
 Alcolgel of silicic acid, **17**, 322.
 Alcohol, allylic, **25**, 133, 998, 999.
 Alcohol, amylic, of fermentation, **8**, 277; **25**, 888.
 — of fermentation, oxidation of, **19**, 483.
 — normal, **24**, 1033.
 Alcohol, anisic, **9**, 190; **25**, 1095.
 Alcohol, benzylic (or benzoic), **7**, 192; **8**, 169; **25**, 926, 928.
 — new homologue of, **15**, 62.
 Alcohol, butylic, acids derived from, by oxidation, **24**, 125.
 — of fermentation (isobutylic), **8**, 264.
 — of fermentation, action of zinc chloride on, **8**, 265.
 — of fermentation, butyl compounds derived from, **22**, 153.
 Alcohol, butylic, normal, **24**, 516.
 Alcohol, caprylic. See Alcohol Octylic.
 Alcohol from castor-oil, constitution of, **6**, 307.
 Alcohol in the wax of *Copernicia cerifera*, **7**, 192.
 Alcohol, cuminic, **8**, 166.
 Alcohol, diatomic, formed from succinic acid, **24**, 810.
 Alcohol, ethylic, absorption of the vapour of, by charcoal, **21**, 190.
 — action of, on carbon tetrabromide, **24**, 784.
 — action of chlorine on, **24**, 345.
 — action of salts on, **24**, 346.
 — action of sulphuric acid on, at high temperatures, **25**, 105.
 — action of zinc upon iodide of ethyl and, **2**, 291.
 — capillary transpiration of, at 20°, **15**, 437.
 — capillary transpiration of, at different temperatures, **15**, 444.
 — decomposition of methyl oxalate by, **1**, 19 (p).
 — detection of, in chloroform and chloral hydrate, **24**, 163.
 — diffusion of, **4**, 89.
 — diffusion of iodine and acetate of potash in, **15**, 228.
 — diffusion of solution of resin in, **15**, 228.
 — elimination of, **25**, 514.
 — estimation of, in fixed ethers, **20**, 500.
 — "first runnings" from the manufacture of, **24**, 1187.
 — formation of, from acetyl chloride, **24**, 228.
 — formation of, from ethylene, **8**, 148; **17**, 39.
 — influence of, on the temperature of healthy men, **25**, 310.
 — latent heat of vapour of, **1**, 38.
 — osmose of, **8**, 61.
 — oxidation of, **19**, 482.
 — preparation of absolute, **III**, 447; **25**, 133.
 — reciprocal decomposition in, **15**, 307.
 — synthesis of normal propyl alcohol from, **24**, 1030.
 — new test for, **24**, 1093.
 — thermal effects of the combination of, with bases, **24**, 976.
 — vapour-density of, **15**, 145, 146, 152.
 Alcohol, ethylic, and acetic acid, action of, upon indigo-blue, **19**, 464.
 — and acetic acid, relation between, **4**, 237.
 Alcohol, ethylic, and acetone, action of hydrochloric acid upon a mixture of, **7**, 246.
 Alcohol, ethylic, and formic acid, action of, on indigo-blue, **19**, 475.
 Alcohol, ethylic, and grape-sugar, action of, on indigo-blue, **15**, 463.

- Alcohol, ethylic, and water, relative expansions of mixtures of, under the influence of a certain rise of temperature, and on a new instrument for taking the specific gravities of the same, **2**, 22 t.
- Alcohol, heptylic, **16**, 218.
- hexylic, **15**, 461.
- β -hexylic, formation of, **16**, 230.
- — products of the oxidation of, **16**, 307.
- — reactions of, **16**, 231.
- Alcohol, isopropylic, **25**, 143, 236.
- mentholic, **15**, 29.
- Alcohol, methylic, absorption of the vapour of, by charcoal, **21**, 190.
- — latent heat of vapour of, **1**, 38.
- — preparation of, **7**, 311.
- — synthesis of, **17**, 42.
- Alcohol, methyl-salicylic, **25**, 1095.
- Alcohol, octylic, **4**, 362; **6**, 307; **7**, 286; **18**, 290.
- propargylic, **25**, 807.
- Alcohol, propionic or propylic of fermentation (normal propyl alcohol), discovery of, **6**, 287.
- Alcohol propylic of fermentation, propyl compounds derived from, **22**, 193.
- Alcohol, propylic, formation of, from propylene, **8**, 149.
- — normal, conversion of allyl alcohol into, **25**, 998.
- — normal, conversion of, into isopropyl alcohol, **25**, 236.
- — normal, synthesis of, **25**, 234.
- Alcohol, syccerylic, action of phosphorus pentachloride on, **15**, 73.
- — preparation and composition of, **15**, 71.
- Alcohol, tertiary, formation of a new, **25**, 1093.
- thio-isopropylic, **25**, 998.
- Alcohol-bases and aniline, behaviour of, with nitrous acid, **3**, 231.
- Alcoholic fermentation. See Fermentation, **25**.
- Alcoholic solution of potash, reaction of, with nitrate of amyl, **20**, 583.
- — reaction of, with nitrite of amyl, **20**, 577.
- Alcoholic solutions of chlorophyll, effect of light on, **25**, 161.
- Alcohol-radicals, constitution of, **3**, 405; **16**, 425.
- — formulae of, **3**, 121.
- — determination of the number and position of, in an aromatic hydrocarbon, **25**, 438.
- — formation of the iodides of the, from Boghead naphtha, **15**, 259.
- — hydrides of the, existing in the products of the distillation of cannel coal, **15**, 419.
- Alcohol-radicals, isomerism among the sulphates of, **23** 418.
- — new method of producing the mercury-compounds of, **16**, 415.
- — production of the sulphates of, from the nitrites, by the action of sulphurous acid, **23**, 415.
- — reaction for the production of the zinc-compounds of the, **17**, 29.
- — direct substitution of, for hydrogen in phosphoretted hydrogen, **24**, 407.
- Alcohols, acidification of, by oxygen gas or atmospheric air, and use of hydrogen in determining vapour-densities, **6**, 205.
- new class of, **10**, 316; **24**, 222.
- formation of, from fatty acids, **24**, 227.
- capillary transpiration of, **15**, 439.
- definition and classification of, **22**, 170.
- reactions of, **23**, 96.
- action of sulphuric acid on a mixture of two, **4**, 235.
- thermal effects of the combination of, with bases, **24**, 975.
- transformation of, into the corresponding nitric ethers, **24**, 1036.
- Alcohols, amylic, constitution of, **24**, 1034.
- diatomic, **12**, 222.
- Alcohols of fermentation, researches on, **25**, 886.
- Alcohols insoluble in water, and water, simultaneous distillation of, **24**, 1029.
- monatomic and hexatomic, formation of, from glucose, **25**, 66.
- normal, oxidation-products of, **24**, 901.
- polyatomic, **12**, 222.
- secondary, formation of, from olefines, **25**, 433.
- tertiary, oxidation of, **25**, 295.
- triatomic, **12**, 242.
- Alcohols and aldehydes, prognosis of new, **19**, 5 t.
- Alcohols and ethers, heat disengaged in combustion of, **6**, 236.
- — constitution of, **3**, 45.
- Alcornoco bark, crystalline substance from, **25**, 299.
- Alcosol of silicic acid, **17**, 321.
- Aldane, **25**, 813.
- Aldehyde, acetic, absorption of the vapour of, by charcoal, **20**, 163.
- — action of bromine on, **24**, 133.
- — action of chlorine on, **24**, 253, 556, 1056.
- — alcoholate of, **24**, 513.

- Aldehyde, acetic, butylene-glycol a normal condensation-product of, **25**, 397.
 ——— condensation of, with separation of water, **25**, 615.
 ——— condensation-products of, **25**, 612, 617.
 ——— conversion of, into chloral by inverse substitution, **24**, 134.
 ——— formation of, from diazoamidobenzoic acid, **18**, 310.
 ——— preparation of acetochloral from, **24**, 384.
 ——— presence of, in "the first runnings" in the manufacture of alcohol from sugar-beet, **24**, 1187.
 ——— production of, in the electrolysis of sugar-solutions, **25**, 578.
 ——— production of, in various fermentations, **25**, 574.
 ——— and sulphaldehyde, compound of, **24**, 383.
 Aldehyde caprylic, **8**, 155.
 ——— chlorobutyric, **25**, 616.
 ——— crotonic, **25**, 616.
 ——— β -hexylic, **16**, 307.
 ——— isobutylic, **25**, 1001.
 ——— of the naphthalene group, **24**, 1057.
 ——— phthalic, preliminary notice on, **19**, 339.
 ——— protocatechuic, new method of preparing, **24**, 1050.
 ——— valeric, preparation of leucine from, **8**, 157.
 Aldehyde-alcohol, note on an, **25**, 808.
 Aldehyde-ammonia and benzoyl chloride, compound produced from, **9**, 265.
 Aldehyde-green, **24**, 142.
 Aldehyde-radicals, substitution of, in ammonia, **8**, 150.
 Aldehydes, action of, on amines, **24**, 957.
 ——— compounds of, with amides, **24**, 151.
 ——— compounds of, with phenols, **25**, 301, 493.
 ——— condensed, with elimination of water, **25**, 810.
 ——— formation of, from alcohols, **17**, 47.
 ——— polymeric modifications of, **25**, 491.
 ——— preparation of, from the acids $C_nH_nO_4$, **9**, 187.
 ——— thermal effects of the combination of, with bases, **24**, 980.
 Aldol, **25**, 808.
 Ales, report upon the alleged adulteration of pale, by strychnine, **3**, 173.
 Algodonite, a mineral containing arsenic and copper, **19**, 289; **14**, 161.
 Alisonite, **14**, 160.
 Alizaric acid, **3**, 249.
 Alizarin, **5**, 69.
 ——— absorption-spectrum of the vapour of, **5**, 665.
 ——— artificial, **23**, 133; **24**, 1195; **25**, 621, 622.
 ——— artificial, printing-colours for, **25**, 188.
 ——— artificial, red colour-printing with, **24**, 603.
 ——— artificial and natural, comparison of, **23**, 140.
 ——— bye-product of the manufacture of, **24**, 535.
 ——— formation of, from anthracene, **23**, 136; **25**, 444.
 ——— preparation of, from paranaphthalene, anthracene, and their homologues, **25**, 1138.
 ——— secondary colouring matter produced in the preparation of, from anthracene, **25**, 659.
 ——— spectrum of, **23**, 142.
 Alizarin and purpurin, optical characters of, **12**, 219.
 ——— distinctive spectra of, **17**, 309.
 Alizarin-sulphonic acid, action of potash on, **25**, 142.
 Alkali, action of a mixture of red prussiate of potash and caustic, upon colouring matters, III, 320.
 ——— determination of, in soft soaps, **24**, 969.
 ——— solubility of oxides in, **25**, 672.
 Alkali-blue on wool, **25**, 1140.
 Alkali-manufacture, loss of soda in the, **20**, 407.
 Alkali-metals, relations of thallium to the, **17**, 126.
 Alkaline bases and sulphates, thermic researches on the electrolysis of, **24**, 985; **25**, 110.
 ——— carbonates, action of boracic acid on, at $212^\circ F.$, **12**, 177.
 ——— action of boracic acid on, at a red heat, **12**, 180, 182.
 ——— use of, for preventing incrustation in steam boilers, **3**, 13.
 Alkaline chlorides, action of oxalic acid on, **1**, 231.
 ——— earths in vegetable ash, II, 187.
 ——— peroxides, oxidation and deoxidation effected by the, **16**, 316.
 ——— salts, solubility of magnesia in, **18**, 27.
 Alkalis, action of, on codeine, **4**, 120.
 ——— action of, on wax, **1**, 248.
 ——— compounds of cotton with the, **5**, 17.
 ——— constitution of aqueous solutions of, III, 155.
 ——— determination of, III, 301.

- Alkalis, determination of, in fire-clay and fire-bricks, **15**, 101.
 — determination of, in iron ores, **15**, 338.
 — determination of, in silicates, **24**, 412.
 — examination of insoluble substances for, **18**, 229.
 — separation of, from magnesia, **1**, 185, 387; **11**, 99; **21**, 519.
 — in vegetable ash, **11**, 188, 190.
 — volumetric estimation of, in waters, **15**, 473.
 Alkalis and acids, reciprocal action of, in solution, when separated by a porous diaphragm, **25**, 460.
 Alkalis and alkaline earths, action of boracic acid upon the carbonates of, **12**, 177.
 — action of bromine on the aqueous solutions of, **15**, 477.
 — preparation of the metals of, by electrolysis, **8**, 27.
 Alkaloid from cinchona bark, **24**, 61.
 — in the seeds of the *Ricinus communis*, or castor-oil plant, **17**, 195.
 Alkaloids, behaviour of, towards sugar and sulphuric acid, **25**, 1127.
 — relation of bases derived from aniline and ammonia to other groups of, **3**, 303.
 — compounds of, with bile-acids, **25**, 829.
 — compounds of iodide and bromide of mercury with the, **11**, 97.
 — double salts of, containing bismuth, **24**, 930.
 — periodides of, **24**, 929, 398.
 — constitution of the phosphates of, **1**, 55.
 — synthesis of, **24**, 113.
 — transformation of phenol into, **25**, 247.
 Alkaloids, artificial, the nitrogenated principles of vegetables considered as the sources of, **3**, 309.
 — obtained by putrefaction, **3**, 314.
 — obtained by the aid of sulphuric acid, **3**, 314.
 Alkaloids from beans, **3**, 309, 313, 314.
 — of cinchona, researches on the, **16**, 273.
 — general character of their iodosulphates, **11**, 130.
 — from fern (*Pteris aquilina*), **3**, 315.
 — from guano, **3**, 314.
 — from horse-flesh, **3**, 314.
 — from flax (*Linum usitatissimum*), **3**, 312.
 — from Lycopodium, **3**, 315.
 Alkaloids, natural, action of sulphuric acid on, **24**, 56.
 Alkaloids of opium, **24**, 932, 1064.
 — physiological action of, **25**, 1107.
 Alkaloids of the *Papaveracea*, **25**, 1028.
 — from peat, **3**, 313.
 — in Peruvian bark, methods of determining the amount of, **24**, 1217.
 — vegetable, new basic products obtained by the decomposition of, **6**, 125.
 — of yellow lupine seed, **25**, 519.
 — from wheat (*Triticum hybernum*), **3**, 312.
 — from wood, **3**, 313.
 Allanic acid, **24**, 1198.
 Allantoic acid, **24**, 1200.
 Allantoin and bodies derived therefrom, **24**, 1197.
 — in the urine of the calf, **2**, 362.
 — preparation of, by Schlieper's method, **24**, 1200.
 — nitrate, **24**, 1198.
 Allanturic acid, **24**, 1199.
 Allophane from Delrin, in Nassau, **25**, 292.
 Allotropic substances, differences exhibited by, **11**, 57.
 Allotropic chloride of silver, **10**, 242.
 Allotropism, elementary, **11**, 97.
 Alloxan, preparation of, **11**, 42.
 Alloxanic acid, **11**, 14.
 Alloxan-sulphurous acid, **11**, 13.
 Alloxantin, **11**, 10.
 Alloy, analysis of an ancient Peruvian, **11**, 252.
 — of lead with platinum, **24**, 202.
 — crystallised, of zinc, iron, lead, and copper, **11**, 393.
 — natural, of silver and copper from Chile, **3**, 29.
 Alloys, **20**, 201.
 — analyses of ancient, **4**, 263.
 — crystalline form of, **20**, 208.
 — elasticity of, **20**, 214.
 — electric conducting power of, **20**, 210.
 — electric spectra of, **17**, 82.
 — expansion of, by heat, **20**, 206.
 — fusing points of, **20**, 207.
 — heat-conducting powers of, **20**, 213.
 — sonorousness of, **20**, 214.
 — specific gravity of, **20**, 204.
 — specific heat of, **19**, 195; **20**, 205.
 — tenacity of, **20**, 215.
 Alloys of lead with mercury, and with platinum, **24**, 1166.
 Alloys of magnesium, **20**, 112.

- Alloys of tin and lead, some physical properties of, **15**, 30, 106.
- Alloys containing lead, tin, antimony and copper, analysis of, **15**, 462.
- Alloys and metals, action of acids on, **19**, 434.
- — — known to the ancients, chemical examination of, **4**, 252.
- Allyl acetate, **10**, 322.
- Allyl alcohol, **10**, 328.
- — — boiling point and atomic volume of, **24**, 346, 905.
- — — combination of, with hypochlorous acid, **25**, 686.
- — — constitution of, **25**, 133.
- — — conversion of, into acrylic acid, **24**, 1039.
- — — cyanide of, **25**, 1092.
- — — oxidation of, **25**, 399.
- — — transformation of, into normal propyl alcohol, **25**, 998.
- Allyl benzoate, **10**, 322.
- butyrate, **10**, 322.
- Allyl compounds, constitution of, **24**, 697.
- Allyl and glycerin compounds, relations between, **24**, 906.
- Allyl cyanate, **10**, 323.
- cyanide, **25**, 1021.
- ethers, **25**, 686.
- group, observations on the, **24**, 906.
- Allyl iodide, **10**, 317.
- — — action of potassium cyanide on, **25**, 890.
- Allyl mercaptan, **10**, 320.
- oxalate, **10**, 321.
- series, methylated phosphorus-urea of the, **13**, 324.
- sulphide, **10**, 320.
- Allyl sulphocyanate, a constituent of the root of mignonette, **25**, 172.
- — — reactions of, with arsines and stibines, **13**, 321.
- — — action of, on triethylphosphine, **13**, 315.
- Allyl tercyanide, preparation of, **18**, 332.
- Allyl urea, **10**, 323.
- valerate, **10**, 322.
- Allylamine, **10**, 325.
- Allyl-ammonias, **10**, 324.
- Allyl-brucine, iodides of, **10**, 399.
- Allylene, constitution of, **25**, 231.
- oxidation of, to propionic acid, **25**, 142.
- — — hydrobromides and hydrochlorides of, **25**, 393.
- — — hydriodide, structure of, **24**, 1027.
- — — identity of the hydrobromide and hydriodide of bromopropylene, with the dihydrobromide and hydrobromiodide of, **25**, 683.
- Allylic series of acids, constitution of, **18**, 154.
- Allyloxamethane, **10**, 321.
- Allyl-potassium-alcohol, **10**, 319.
- Allylsulphonic acid, **25**, 405.
- Aloes, crystalline principles of, **25**, 153, 299.
- — — new acid from, **25**, 489.
- Aloes, Natal, action of nitric acid on, **25**, 153.
- Aloin, **25**, 204.
- Aloresinic acid, **25**, 489.
- Alpaca, dying of, with iodine green, **25**, 288.
- Alpha-nitrobenzoic acid, **18**, 319.
- Alpha-toluic acid, nitration of, **25**, 1097.
- Alum in bread and its detection, **10**, 103; **25**, 923, 1013.
- Alum, crystallisation of, **25**, 188.
- — — complex, from the hot mineral water of the solfatara of Puzzuoli, **25**, 226.
- Alumina, absorption of ammonium salts by, **21**, 12.
- — — absorption of potassium salts by, **21**, 10.
- — — analysis of the soluble hydrate of, **6**, 227.
- — — atomic volume and specific gravity of, III, 92, 97.
- — — decomposition of, at a red heat, by charcoal and chlorine, III, 356.
- — — detection of, III, 57.
- — — in *Lycopodiaca*, **14**, 222.
- — — part played by, in the manufacture of superphosphates, **25**, 848.
- Alumina salts. See Aluminium Salts.
- — — soluble, preparation of, by dialysis, **15**, 247.
- Alumina and ferrie oxide, part taken by, on the absorptive action of soils, **21**, 1.
- — — separation of, **25**, 920.
- — — separation of, by potash, **15**, 331.
- Alumina and titanio acid, separation of, **15**, 325.
- Alumina, titanio acid and ferrie oxide, separation of, **15**, 333.
- Aluminium, **8**, 239.
- — — electrolytic method of preparing, **8**, 240.
- — — plating with, **25**, 1134.
- — — properties of, **8**, 241.
- — — reflecting power of, for chemical rays, **17**, 77.
- — — specific gravity and atomic volume of, III, 60.
- Aluminium acetate, as a mordant, **16**, 408.
- — — osmose of, **8**, 86.
- — — precipitate from, with chloride of sodium, **6**, 231.
- — — acetates, **6**, 212.

- Aluminium acetates, insoluble, **6**, 218.
 ———— soluble, **6**, 222.
 Aluminium biacetate, soluble, **6**, 222.
 Aluminium carbonate, **2**, 216; **13**, 90.
 Aluminium chloride as a mordant, **16**, 410.
 ———— osmose of, **8**, 85.
 ———— chlorides, commercial, **23**, 930.
 ———— chromate, **4**, 301.
 Aluminium hydrate from the insoluble biacetate, **6**, 228.
 ———— from the soluble biacetate, **6**, 225.
 Aluminium bihydrate soluble in water, **6**, 225.
 ———— metaphosphate, **III**, 277.
 ———— selenites, **2**, 61.
 Aluminium sulphate, from Iquique, Peru, **22**, 259.
 ———— bibasic, **6**, 229.
 ———— diffusion of, **4**, 95.
 ———— osmose of, **8**, 85.
 Aluminium and thallium, double sulphate of, **17**, 142.
 Aluminium-ethyl and aluminium-methyl, **13**, 189, 194.
 Alums, crystalline dissociation of, **23**, 1068.
 ———— decomposition of, by heat in solution, **23**, 691.
 ———— volumes of certain, **11**, 411.
 Alrine evacuation, object of, **13**, 418.
 Amalgam of copper, **16**, 381.
 ———— of iron, **16**, 378.
 ———— of lead, **16**, 385.
 ———— of platinum, **16**, 384.
 ———— of silver, **16**, 383.
 ———— of tin, **16**, 386.
 ———— of zinc, **16**, 384.
 Amalgamation of silver ores, **24**, 447.
 Amalgams, **16**, 378.
 ———— existence of the so-called compound ammonium, **24**, 491.
 Amalic acid, **3**, 88.
 Amarine, new mode of formation of, **8**, 161.
 Amarine, furfarine, and anisine, formation of, **7**, 95.
 Amarine acid, **24**, 549.
 "Amazon," chemical report on the cause of the fire in the, **3**, 34.
 Amblygonite, **23**, 126, 468, 793.
 Amblystegite, identity of, with hypersthene, **24**, 1179.
 American petroleum, most volatile constituents of, **13**, 54.
 Amethenic acid, **24**, 217.
 Amidated oxychlorides of phosphorus, **22**, 16.
 Amides, **1**, 62; **6**, 193,
 ———— action of liquid phosgene upon, **23**, 718.
 Amides, action of β -toluenesulphonic chloride on, **23**, 148.
 ———— compounds of, with aldehydes, **24**, 151.
 Amides, pyrophosphoric, **21**, 64.
 Amides and amines, **11**, 284.
 Amides and anilides, table of, **4**, 64.
 ———— of succinic acid, relations between the, **23**, 496.
 Amides and nitriles, action of sulphuric on the, **9**, 241.
 Amidic and amilic acids, table of, **4**, 65.
 Amido-acetate, phenylic, **23**, 144.
 Amido-acids, **23**, 147.
 Amidoanisic acid, **18**, 312.
 Amidobenzene-sulphonic acids, **23**, 245, 405.
 Amidobenzoates (benzamates), **9**, 269.
 Amidobenzoic (benzamic) acid, **9**, 269; **18**, 300.
 Amidobenzoic acid, action of carbon bisulphide on, **24**, 238.
 ———— two isomeric sulpho-acids of, **23**, 717.
 Amidobenzoic hydriodides, α and β , **18**, 321.
 Amidocamphoric acid, **23**, 117.
 ———— anhydride, **23**, 896.
 Amido-carboxamidonitrophenylic acid, **23**, 712.
 Amidochromate of potassium, **24**, 890.
 Amido-compounds, action of, on chloral, **23**, 611.
 Amido-derivatives, aromatic, direct formation of, **23**, 149.
 Amido-lacrylic acid, **23**, 711.
 Amidogen bases, **3**, 96.
 ———— table of, **4**, 326.
 Amidogen compounds of tungsten, **3**, 171.
 Amidogens, **17**, 162.
 Amido-nitride of tungsten, **3**, 172.
 Amido-nitride nitrobenzoic (chrysanisic) acid, **24**, 555.
 Amido-nitrochlorophenol, **23**, 14.
 Amido-nitrosogens, **17**, 162.
 Amido-phenol, **19**, 207.
 Amido-salicylic acid, conversion of, into oxaniline, **17**, 194.
 Amido-sulphomesitylenic acids, **24**, 376.
 Amido-sulphotolulylenic acid, **24**, 253.
 Amido-uramidonitrophenylic acid, **23**, 712.
 Amines, diagnosis of primary, secondary, and tertiary, **24**, 111.
 Ammonia, absorption of, from the air by humus, **23**, 917.
 ———— absorption of, by charcoal, **18**, 290.
 ———— absorption of, by charcoal under pressure, **24**, 78.
 ———— relation between the amount of, absorbed in water at 0° C., and the

pressure under which the absorption occurs, **12**, 147.

Ammonia, relation between the amount of, absorbed in water under the ordinary atmospheric pressure, and the temperature at which the absorption occurs, **12**, 150.

Ammonia and air, absorption of, in water, **17**, 90.

Ammonia and hydrogen, absorption of, in water, **17**, 98.

Ammonia and hydrochloric acid, absorption of, in water, **12**, 128.

Ammonia, action of, on amyl iodide, **4**, 324.

— action of, on amyl nitrite, **20**, 577.

— action of, on bisulphochloride of amylene, **12**, 119.

— action of, on bromacetic acid, **11**, 29.

— action of, on bromide of bromethyl-triethyl-phosphonium, **14**, 325.

— action of, on carbon tetrabromide, **24**, 783.

— action of, on chloroplatinate of ammonium, **3**, 176.

— action of, on α -chloropropionic and β -iodopropionic acids, **24**, 127.

— action of, on diazo-amidobenzoic acid, **18**, 310.

— action of ethyl bromide on, **3**, 299.

— action of ethyl chloride on, **13**, 331.

— action of, on methyl iodide, **4**, 320.

— action of, on oils and fats, **7**, 200.

— action of, on phenyl, **24**, 123.

— action of, on phosphorus, **24**, 1169.

— action of potassium permanganate on, in strongly alkaline solutions, **21**, 29.

— action of, on the platinosulphocyanides, **7**, 36.

— action of, on sebacic ether, **4**, 334.

— action of, on stibethyl iodide, **9**, 278.

— action of, on sulphochloride of phosphorus, **18**, 1.

— amount of, in the air of towns, **11**, 229.

— amount of, in Southwark and Lambeth waters, **8**, 102.

— highest, lowest, and average amounts of, and total solid matter in mixed samples of Rugby sewage at different times, **19**, 93.

— assimilation of, by yeast, **25**, 641.

— methods of demonstrating its composition, **13**, 77 ; **18**, 167.

— constitution of the aqueous solution of, **11**, 185, 187, 189.

— apparatus for condensing, **24**, 186.

— diffusion of, **4**, 89.

Ammonia, estimation of, **11**, 240.

— estimation of, in water, **18**, 125.

— estimation of, in potable waters, **21**, 87, 103.

— estimation of, in well-water, **23**, 1011.

— estimation of, in soluble phosphates by means of calcined magnesia, **25**, 89.

— evolved by alkaline permanganate acting on organic nitrogen-compounds, **21**, 161.

— formation of, from atmospheric nitrogen, **1**, 197.

— formation of organic bases by the direct substitution of organic radicals for the hydrogen in, **11**, 278, 287.

— grains of, per gallon, in different samples of metropolitan sewage, **19**, 90.

— heat evolved in the formation of, **6**, 250.

— how to exhibit the inflammability of, **13**, 78.

— occurrence of, in the Donnington water, **11**, 215.

— occurrence of, in smoke from common fires, **11**, 232.

— occurrence of, in snow-water, **25**, 980.

— passage of, through heated platinum, **20**, 262.

— per gallon and estimated value of total constituents in one ton of sewage at different dilutions, **19**, 101.

— production of, by the combination of free nitrogen with hydrogen evolved in the decomposition of organic matter? **16**, 168.

— production of, in alcoholic fermentation, **24**, 916.

— quantities of, evolved from various animal fluids by potash and by potassium permanganate, **25**, 646.

— quantity of free and albuminoid, in different waters, **20**, 454.

— relation of, to bases derived from aniline and to other groups of alkaloids, **3**, 303.

— solubility of, in water, **14**, 17.

— specific gravity of, **11**, 192.

— test for, **25**, 263.

— Nessler test for, **21**, 103, 161.

Ammonia, aqueous, vapour-density of, **15**, 160.

Ammonia bases, action of chloride of cyanogen on the, **7**, 184.

— estimation of typical hydrogen in, **24**, 957.

Ammonia, crude, testing of the fitness of, for use as manure, **25**, 918.

Ammonia and its derivatives, **11**, 252 ; **12**, 62.

- Ammonia, acetyl derivatives of, **24**, 407.
 — acid derivatives of, constructed on the water type, **12**, 94.
 — basic derivatives of, constructed on the water type, **11**, 270.
 Ammonia and water, combination of carbonic anhydride with, **23**, 171.
 Ammonia, carbonic anhydride, and water, the single or chemical substances produced by condensing mixtures of, **23**, 273.
 Ammonia carbonate, commercial, **23**, 231.
 — — — formerly found in commerce, not a single substance, **23**, 278.
 — — — commercial, products of the slow distillation of, **23**, 266.
 Ammonia, commercial acid carbonate of, **23**, 240.
 Ammonia carbonates examined by Rose, **23**, 279.
 Ammonia gas, electric spectra of metals in, **17**, 86.
 Ammonia, liquid, solubility of alkali-metals in, **24**, 309.
 Ammoniacal compounds of cobalt, **4**, 355.
 — — — of glyoxylates, **18**, 196.
 Ammoniacal deposit formed by the process of drying blood, **18**, 340.
 Ammonia-meter, description of an, **3**, 206.
 Ammonia-process for the analysis of milk, **25**, 1014.
 Ammonia-salts. See Ammonium salts.
 Ammonio-azophosphate of iron, **3**, 146, 152.
 Ammonio-boric ethide, **15**, 369.
 — — — methide, **15**, 377.
 Ammonio-chrome compound, **13**, 252.
 Ammonio-ferrous sulphate, amount of combined water in, **25**, 1079.
 — — — uselessness of for the estimation of chlorine, **24**, 753.
 Ammonio-magnesium carbonate, products of the distillation of, **23**, 272.
 Ammonio-nickel chromate, **24**, 108.
 Ammonio-perchlorate of copper, **16**, 88.
 Ammonio-sodic phosphate, composition of the precipitate formed by adding a solution of, to solution of calcium chloride, **25**, 673.
 Ammonium, **24**, 309.
 — substitution of the aldehyde radicals in, **8**, 150.
 Ammonium amalgams, compound, **24**, 491.
 Ammonium amylphosphate, **9**, 139.
 — — — anchoate, **10**, 173.
 — — — apophyllate, **5**, 267.
 — — — arsenite, **15**, 297.
 Ammonium azophosphate, **3**, 152.
 — — — benzoglycollate, **5**, 77.
 — — — bihomacetate, **12**, 4.
 — — — bicarbonate of the China Isles, **16**, 74.
 — — — diffusion of, **4**, 103.
 Ammonium bichromate, **1**, 20; **3**, 199.
 — — — double salts of, with the chlorides of mercury, **1**, 21; **3**, 202.
 Ammonium bimeconate, **4**, 364.
 — — — biethylmeconate, **6**, 77.
 — — — binallate, formation of aspartic acid from, **3**, 187.
 — — — bibasic meconate of, action of chlorine on, **6**, 73.
 — — — bisulphite, compound of, with hydride of ethyl-salicyl, **20**, 424.
 — — — compound of, with hydride of methyl-salicyl, **20**, 420.
 Ammonium bromacetate, **11**, 23.
 — — — bromocorunarilate, **24**, 49.
 — — — cadmio-chloride, **1**, 105.
 — — — carbamate, **23**, 214.
 — — — produced by condensing mixtures of carbonic anhydride, ammonia, and water, **23**, 273.
 — — — distinction of, from carbonates, **23**, 228.
 — — — dissociation-tensions of, **24**, 1195.
 Ammonium carbamate and acid carbonate, precipitation of, by calcium chloride, **23**, 359.
 Ammonium carbonate, action of, on magnesium salts, **15**, 196.
 — — — direct conversion of, into urea, **21**, 194.
 Ammonium carbonate, acid, **23**, 198.
 — — — — produced by condensing mixtures of carbonic anhydride, ammonia, and water, **23**, 274.
 — — — — distillation of, **23**, 263.
 Ammonium carbonate, half-acid, **23**, 189.
 — — — — distillation of, **23**, 265.
 Ammonium carbonate, normal, **23**, 172.
 — — — — distillation of, **23**, 261.
 Ammonium normal orthocarbonate, existence of, **23**, 213.
 Ammonium carbonates, constitution of, **23**, 209.
 Ammonium chloride, diffusion of, **4**, 103.
 Ammonium chloride and magnesium salt, composition of the crystalline deposit from a mixture of, **25**, 674.
 Ammonium chrysanisate, **3**, 77.
 — — — comenate, **11**, 118; **4**, 370.
 — — — cuminate, products of the decomposition of, by heat, **11**, 404.
 — — — deutazophosphate, **3**, 360.
 — — — dialurate, **11**, 11.
 — — — diazo-amidoanisate of, **18**, 313.

Ammonium diazo-amidobenzoate, **18**, 301.

— diazo-amidotoluylate, **18**, 316.

— disulphetholate, **9**, 251.

— disulphometholate, **9**, 246.

— hydriopiperate, **15**, 21.

— hydrosulphate, compound of oil of mustard with, **8**, 184.

— iodide, **16**, 240.

— leucate, **14**, 310.

— meconate, action of heat on, **6**, 72.

— meconate, bibasic, **6**, 72.

— nitrite, formation of, in combustion and in vital processes, **25**, 35.

— nitrite and nitrate in solution, heat evolved in the formation of, **24**, 1002.

— nitrococcusate, **III**, 473.

— nitrotoluylate, **III**, 437.

— oxide, table of analogues of, **4**, 236.

— perchlorate, **16**, 87.

— platino-tersulphocyanide, **7**, 31.

— pyrophosphotriamate, **19**, 10.

— pyrotartanilate, **8**, 173.

— pyrophosphodiamate, **19**, 294.

Ammonium salts, action of normal and acid salts upon, **24**, 785.

— — decomposition of, **II**, 244.

— — influence of, on the precipitation of phosphoric acid by ammonium molybdate, **25**, 264.

— — influence of, on the productiveness of land, **24**, 281.

— — thermo-chemical researches on, **24**, 1128 ; **25**, 19, 21.

Ammonium selenites, **2**, 58.

— selenocyanate, **4**, 19.

— sulphacetate, **9**, 247.

— sulphite, **III**, 293.

— sulphobutyrate, **9**, 253.

— sulphocoumarilate, **24**, 50.

— sulphocyanate, influence of, on plant growth, **25**, 917.

— sulphopropionate, **9**, 252.

— tartanilate, **8**, 181.

— thionurate acid, **II**, 13.

— toluylate, **III**, 431.

Ammonium and cadmium, chloride of, **8**, 253.

— — sulphate of, **8**, 255.

Ammonium and copper, sulphite of, **III**, 298.

Ammonium and didymium, sulphate of, **6**, 270.

Ammonium and glucinum, carbonate of, **8**, 247.

— — oxalate of, **8**, 348.

Ammonium and magnesium, carbonate of, **15**, 199.

Amorphous sediment in urine, its decomposition by washing with water, **15**, 206.

Amorphous sulphide of mercury, occurrence of, in the mineral kingdom, **24**, 671.

Amphioxus, hæmoglobin in the plasma of, **25**, 256.

Amygdalin, action of acids on, **1**, 398.

Amyl, action of chlorine on, **16**, 127.

— — analysis and vapour-density of, **3**, 33.

— — boiling point of, **3**, 34.

— — isolation of, **3**, 32.

Amyl acetate, oxidation of, **19**, 485.

Amyl alcohol, capillary transpiration of, **15**, 439.

— — gradual oxidation of, with sulphuric acid and bichromate of potash, **19**, 483.

— — physiological action of, **3**, 119.

— — production of acetic and propionic acids from, **19**, 333.

— — valerianic acid from, **25**, 243.

Amyl alcohol of fermentation, **25**, 888.

Amyl alcohol, normal, **24**, 1033.

— — rotating and non-rotating, **8**, 277 ; **23**, 96.

Amyl arsenate, **24**, 818.

— — arsenite, **24**, 819.

— — bisulphide, preparation of, **3**, 158.

— — bioxysulphocarbonate, action of ammonia on, **2**, 142.

— — bisulphide, **2**, 94.

— — bromacetate, **11**, 26.

Amyl bromide, **22**, 198.

— — action of, on amylaniline, **3**, 298.

— — action of, on aniline, **3**, 297.

— — action of, on diamylaniline, **4**, 323.

— — action of, on ethylaniline, **3**, 299.

Amyl caproate, **3**, 210 ; **24**, 360.

Amyl carbonate, **1**, 370.

— — preparation of, **5**, 131.

Amyl chloride and morphine, reaction between, **6**, 132.

Amyl chlorocarbonate, **1**, 372.

Amyl compounds, researches on, **1**, 368 ; **2**, 94, 212 ; **11**, 245.

Amyl diamyloxalate, **22**, 56.

— — diethoxalate, **22**, 54.

— — diphenylallophanate, **24**, 394.

Amyl ethers, normal, **24**, 1033.

Amyl ethylate, **4**, 233.

— — gallate, **24**, 822.

— — hydrate, action of phosgene gas on, **1**, 370.

Amyl hydride, **3**, 34, 41.

— — from Boghead naphtha, **15**, 361.

— — from cannel coal, **15**, 421.

Amyl hydride, normal, **25**, 1085

Amyl iodide, **3**, 30.

- Amyl iodide, action of, upon amylamine and ammonia, **4**, 324.
 ——— action of, on triethylamine, **4**, 313.
 ——— action of, on potassium-alcohol, **4**, 108.
 ——— action of sodium-amalgam on, in presence of acetic ether, **19**, 420.
 ——— oxidation of, **19**, 486.
 Amyl iodide and amyl oxalate, action of zinc upon a mixture of, **22**, 55.
 Amyl iodide and ethyl oxalate, action of zinc upon a mixture of, **22**, 46.
 Amyl iodide and sodium, action of, upon acetic ether, **19**, 418.
 Amyl nitrate, **20**, 581.
 ——— action of acetic acid on, in presence of sulphuric acid, **22**, 188.
 ——— action of formic acid on, in presence of sulphuric acid, **22**, 190.
 ——— action of zinc-ethyl on, **21**, 174.
 ——— oxidation of, **19**, 487.
 Amyl nitrite, **11**, 245 ; **20**, 576 ; **25**, 1092.
 ——— action of hydriodic acid on, **20**, 168, 578.
 ——— action of nascent hydrogen on, **11**, 250.
 ——— action of phosphorus on, **11**, 250.
 ——— action of potassium and of chlorine on, **11**, 248.
 ——— action of sulphurous acid on, **23**, 416.
 ——— action of zinc-ethyl on, **21**, 171.
 ——— decompositions of, **19**, 336.
 ——— preparation of, **23**, 419.
 Amyl nitrites, isomeric, **23**, 474.
 Amyl cananthyates, **6**, 316.
 Amyl phosphite, tribasic, **7**, 218.
 Amyl propargylate, **25**, 687.
 Amyl sulphocyanate, preparation of, **1**, 373 ; **2**, 95.
 ——— action of nitric acid on, **1**, 375.
 Amyl tricarballoylate, **18**, 335.
 Amyl valerate, oxidation of, **19**, 485.
 ——— preparation of, by oxidation of amyl alcohol, **24**, 902.
 Amylamine, action of amyl bromide on, **2**, 322.
 ——— action of amyl iodide on, **4**, 324.
 ——— action of carbon bisulphide on, **13**, 60.
 ——— formation of, **4**, 322.
 ——— oxidation of, **19**, 488 ; **21**, 162.
 ——— platinum-salt of, **15**, 361.
 Amylaniline, action of ethyl bromide on, **3**, 299.
 Amylate of ethyl, **4**, 233.
 Amylate of sodium, action of, on nitrate of methyl, **20**, 585.
 ——— action of, on palmitin, **5**, 314.
 Amyl-brucine, periodides of, **24**, 399, 406.
 Amylene, absorption of the vapour of, by charcoal, **20**, 164.
 ——— action of, on benzoyl dioxide, **24**, 1011.
 ——— action of nitroxine on, **13**, 130.
 ——— action of phosphorus pentachloride on, **14**, 136.
 ——— action of sulphur chloride on, **12**, 114.
 ——— condensation of, **23**, 1087.
 ——— constitution of, **25**, 431.
 ——— oxidation of, **19**, 491.
 Amylene, a new, produced by the action of hydriodic acid on dimethyl-ethyl carbinol, **24**, 1036.
 Amylene bichlorosulphide, **12**, 115.
 ——— biacyanide, **14**, 137.
 ——— binitroxide, **13**, 46, 130.
 ——— bisulphochloride, action of ammonia on, **12**, 119.
 ——— action of nitric acid on, **13**, 45.
 ——— fractional solution of, in alcohol, **14**, 129.
 Amylene bithiocyanide, **14**, 133.
 ——— bithio-bithiocyanide, **14**, 134.
 Amylene and ethylene, action of the chlorides of sulphur upon, **12**, 112.
 Amylene group of phosphorus bases, **14**, 311.
 Amylethylaniline or amylethylphenylamine, **3**, 299.
 Amylhydroxalate, ethylic, **22**, 57.
 Amylhydroxalic acid, **22**, 52.
 Amylic series, bases of the, **4**, 322.
 ——— researches on the, **1**, 368 ; **2**, 212 ; **11**, 245.
 Amylide, mercuric, action of zinc on, **17**, 32.
 Amylnitrophosphorous acid, **11**, 251.
 Amylphenylamine, **3**, 96, 297.
 Amylphosphates, **9**, 131.
 Amylphosphoplatinous ether, **23**, 1090.
 Amylphosphoric acid, preparation of free, **9**, 139.
 Amylpipeidine, **6**, 181.
 Amylstrychnine, tri-iodide of, **24**, 399.
 Amylsulphocarbamate of amylammonium, **13**, 61.
 Amylsulphocarbamic acid, **13**, 61.
 Amyltriethylammonium, **4**, 314.
 Amylurethane, **2**, 212.
 Analyses in the dry way, application of sulphuretted hydrogen to, **25**, 841.
 Analyses of soils, real value of, **24**, 277.
 Analysis, methods of, **24**, 155, 156.

Analysis, liquid diffusion applied to, **15**, 216.
 ——— circumstances tending to disguise the presence of acids and bases in, **10**, 110.
 ——— use of bromine in, **24**, 951.
 ——— preparation for, and methods of, in experiments on the assimilation of free nitrogen by plants, **146**, 139.
 Analysis of a biliary concretion, **230**, 455.
 Analysis of gases, **17**, 238; **21**, 128.
 Analysis, organic, notes on, **24**, 957.
 ——— combustion blow-pipe for, **17**, 49.
 ——— use of gas as fuel in, **6**, 209; **11**, 30.
 ——— Magnus's gas apparatus for, **7**, 250.
 ——— reduction of the oxides of nitrogen by metallic copper in, **19**, 359.
 Analysis, qualitative, the general routine of, for metals, **18**, 97, 226.
 ——— use of the prism in, **10**, 79.
 Analysis, quantitative, experiments on the application of the measurement of gases to, **21**, 310.
 ——— by limited oxidation, **20**, 173.
 Analysis of salts by the employment of voltaic energy, **25**, 113.
 Analysis, spectral, **13**, 270; **25**, 1113.
 Analysis, volumetric, a very generally applicable method of, **8**, 219.
 ——— sources of error in, **24**, 156.
 Analysis of water, simple apparatus for determining the gases incident to, **21**, 109.
 ——— of water with the hydrofimeter, **24**, 582.
 ——— of water, determination of the nitrogenous organic matter, **20**, 445.
 ——— of water, sulphuric acid estimation, **24**, 439.
 ——— of water, verification of Wanklyn and Chapman's method on a series of artificial waters, **20**, 591.
 ——— of water, volumetric process for the, **15**, 468.
 ——— of potable waters, **18**, 117; **21**, 77.
 ——— of potable waters by Frankland and Armstrong, note on, **21**, 152.
 Anchoic acid and anchoates, **10**, 169—173.
 Anchoic acid produced by the oxidation of paraffin with nitric acid, **21**, 470.
Andropogon Ivaracusa, oil of, **11**, 122.
 Anethene, **25**, 3.
 Anhydrides, formation of, **24**, 333.
 ——— action of phosphorous chloride on, **24**, 491; **25**, 222.

Anhydrides and ethers, reaction for the production of, **18**, 21.
 Anhydrite, **24**, 1180.
 ——— formation of, together with rock-salt, **25**, 126.
 Anhydrous bases, combination of acids with, **6**, 246.
 Anilides, **2**, 36.
 ——— action of anhydrous phosphoric acid on, **2**, 331.
 ——— of the carbohydrates, **25**, 149.
 ——— of citric acid, **5**, 285.
 ——— of oxalic acid, **2**, 304.
 ——— of pyrotartaric acid, **8**, 172.
 ——— of racemic acid, **8**, 181.
 ——— of tartaric acid, **8**, 179.
 Aniline, **11**, 26.
 ——— absorption of the vapour of, by charcoal, **20**, 162.
 ——— action of amyl bromide on, **3**, 284.
 ——— action of carbon bisulphide on, **2**, 48.
 ——— action of, on carbon tetrabromide, **24**, 782.
 ——— action of chloral on, **24**, 931.
 ——— action of chlorine on, **11**, 270.
 ——— action of cyanogen on, **1**, 160; **24**, 142.
 ——— action of cyanogen chloride, bromide, and iodide on, **1**, 285, 311.
 ——— action of ethyl bromide on, **3**, 297.
 ——— action of iodine on, **1**, 271.
 ——— action of iodine chloride on, **17**, 328.
 ——— action of chloride of lime on, **22**, 25.
 ——— action of heat on sulphocyanate of, **2**, 46.
 ——— action of methyl bromide and iodide on, **3**, 295.
 ——— action of phenyl alcohol on, **3**, 283.
 ——— action of sulphur chloride on, in presence of carbon bisulphide, **24**, 264.
 ——— action of sulphuric acid on, **9**, 259.
 ——— chlorine- and bromine-substitution products of, **19**, 61.
 ——— compounds of, with metallic iodides, **25**, 249.
 ——— constitution of, **3**, 96.
 ——— conversion of, into toluidine, **25**, 1023.
 ——— decomposition-product from commercial, **25**, 502, 1100.
 ——— formation of, from phenol, **25**, 248.
 ——— various modes of formation of, **11**, 249.
 ——— methylation of the phenyl group in, **24**, 1060.
 ——— preparation of, from coal-tar, **14**, 231.

- Aniline, preparation of fuchsine by the action of mercurous nitrate on, **14**, 238.
- preparation of fuchsine by the action of stannic chloride on, **14**, 237.
- production of a blue substance by the electrolysis of sulphate of, **15**, 161.
- reactions of, **25**, 824.
- solidifying point of, **25**, 502.
- Aniline and the alcohol-bases, behaviour of, with nitrous acid, **3**, 231.
- Aniline and ammonia, relation of bases derived from, with other groups of alkaloids, **3**, 303.
- Aniline black, **25**, 853, 884.
- — dyeing of cotton fabrics with, **25**, 1140.
- — preparation of an oxidised, **24**, 1098.
- Aniline blue for printing, **25**, 186.
- — sulpho-acids of, **25**, 717.
- Aniline citrate, monobasic, **5**, 287.
- Aniline colours, adulteration of, **25**, 939.
- — dissolved in collodion, use of, **25**, 1143.
- — extraction of, **24**, 861.
- — fixing of, on cotton-wool, **25**, 340.
- — manufacture of, **25**, 1046.
- — manufacture of, without arsenic, **25**, 938.
- — uses of, **24**, 971, 972.
- — valuation of, **25**, 331.
- Aniline green, or emeraldine, **14**, 241.
- — method of applying, to fabrics, **14**, 253.
- Aniline lacquers, transparent, **24**, 862.
- Aniline lakes, colouring of paper and leather with, **25**, 339.
- Aniline metaphosphate, **III**, 233.
- Aniline oil and aniline black, **25**, 338.
- Aniline phosphates, **III**, 227—233.
- Aniline purple, dyeing of silk with, **14**, 250.
- — dyeing of wool with, **14**, 251.
- — preparation of, **14**, 233.
- — properties of, **14**, 234.
- Aniline pyrophosphate, **III**, 232.
- Aniline red, formation of, **25**, 822.
- Aniline salts, action of anhydrous phosphoric acid on various, **2**, 331, 333.
- Anilo-cyanic acid, action of heat on, **2**, 313.
- Anilo-urea, **2**, 37.
- Animal body, formation of sulphuric acid and urea, and behaviour of taurine in, **25**, 1033.
- — utilisation of certain inorganic constituents in the, **24**, 1072.
- Animal cellulose, **25**, 309.
- Animal charcoal, action of, in sugar-making, **25**, 937.
- Animal chemistry, some new researches in, **III**, 290.
- Animal heat, source of, **21**, 47.
- Animal mucus, dialysis through, **15**, 242.
- Animal organism, storing up of fat in the, **25**, 1031.
- Animal proteids, aspartic and glutamic acids obtained from, **24**, 722.
- Animal starch, **24**, 838.
- Animal substances, incineration of, **24**, 855.
- — containing phosphorus, behaviour of, when undergoing decomposition, **24**, 734.
- — products of the destructive distillation of, **5**, 50.
- Animal system, passage of cumic acid through the, **3**, 181.
- Animal and vegetable kingdoms, observations on the adjustment between the, **3**, 52.
- Anise, oil of, **17**, 5.
- Anisic acid, formation of, by the action of nitrous acid on diazo-amidoanistic acid, **18**, 315.
- — preparation of, **10**, 212.
- — action of sulphuric acid on, **10**, 211.
- Anisic alcohol, **9**, 190; **25**, 1095.
- Anisidine, **3**, 75.
- Anisine, amarine and furfurine, formation of, **7**, 95.
- Anisoates of baryta, **9**, 186.
- Anisoic acid, **9**, 186.
- Anisol, **3**, 74.
- Anisol, benzylated, **25**, 703.
- Anisyl and benzoyl compounds, table of, **4**, 68.
- Annelida*, hæmoglobin in, **25**, 256.
- Anorthite, relation of, to albite, **25**, 51.
- Anthoxanthum odoratum*, detection of coumarin in, **III**, 218.
- Anthracene, action of bromine on, **15**, 49.
- — action of chlorine on, **15**, 50.
- — action of nitric acid on, **15**, 48.
- — constitution of, **15**, 44; **25**, 444.
- — derivatives of, **24**, 13; **25**, 139.
- — formation of, from alizarin, **23**, 135.
- — fluorescence of, **24**, 21.
- — preparation of, from coal-tar pitch, and preparation of dye-stuffs from, **24**, 1222.
- — refraction-equivalent of, **23**, 151.
- — secondary colouring matter produced in the preparation of alizarin from, **25**, 659.

- Anthracene bichloride, **15**, 51.
 — hexbromide, **15**, 49.
 Anthracene, tetrabrominated, **15**, 40.
 Anthracenic acid, **15**, 49.
 Anthracenuse, **15**, 45.
 Anthrachryson, **25**, 1015.
 Anthrallic acid, **24**, 380, 1109; **25**, 1139.
 Anthrahydroquinone, **25**, 139.
 Anthranilic acid and benzanic acid, difference between, **5**, 131.
 Anthranilic acid, formation of, from indigo-blue, **19**, 470.
 Anthraquinone, **23**, 136.
 — derivatives of, **24**, 534.
 — fluorescence of, **24**, 22.
 — formation of benzoic acid from, **25**, 445.
 — nitrogen-compounds of, **24**, 531, 533.
 — direct oxidation of, by potassium hydrate, **25**, 484.
 — reactions and derivatives of, **25**, 139.
 — vapour-density of, **25**, 295.
 Anthraquinone - disulphonic acid, **25**, 140.
 Anthraquinonic acid (alizarin), **23**, 136.
 Anthropin, a substance discovered in human fat, **5**, 85.
 Antimonate of sodium, **25**, 41.
 Antimonic acid, **11**, 83.
 — — action of hydrochloric acid upon sulphide of mercury in presence of, **12**, 159.
 Antimonious acid, **11**, 83.
 Antimonious chloride, action of water on, **24**, 662.
 Antimonious hydrate, composition of, **25**, 223.
 — — action of phosphorous chloride on, **25**, 222.
 Antimonite and antimonate of lead, crystalline compounds of, from Constantine, **24**, 1016.
 Antimony, contributions to the chemical history of, **25**, 41.
 — action of, on carbon tetrabromide, **24**, 784.
 — crocus of, **25**, 42.
 — detection of, **24**, 759.
 — detection of, by electrolysis, **13**, 20.
 — electro-deposited, **16**, 365.
 — estimation of, **25**, 176.
 — estimation of, in commercial copper, **14**, 293.
 — modification of the reactions of, by citric acid, **10**, 116.
 — organic bases containing, **5**, 66.
 — organo-compounds of: their formation, **13**, 186, 189.
 — organo-compounds of: their properties, **13**, 209.
 Antimony, separation of mercury from, **12**, 32.
 — separation of, from arsenic and from tin, **25**, 177.
 — separation of, from tin, **15**, 462.
 — solubility of, **11**, 20.
 — specific gravity and atomic volume of, **11**, 61.
 — melted, specific gravity and atomic volume of, **11**, 77.
 — symbol of, in Brodie's chemical calculus, **21**, 440.
 — thermo-electric properties of, **10**, 77.
 — thermo-electric joints formed with, and with bismuth and palladium, **8**, 36.
 Antimony and arsenic, detection of minute traces of, in copper, **14**, 295.
 Antimony and arsenic, separation of, **1**, 388; **13**, 79.
 Antimony, arsenic, nitrogen and phosphorus bases compared, **11**, 76.
 Antimony and copper, reciprocal precipitation of, **9**, 29.
 Antimony, lead, tin and copper, analysis of alloys containing, **15**, 462.
 Antimony, tin, and arsenic, detection and qualitative separation of, **5**, 104, 210.
 Antimony blue, **25**, 934.
 Antimony compounds, reactions of, with sodium sulphide, **25**, 42.
 Antimony-methyl, **16**, 22.
 Antimony oxide, **11**, 83.
 — — native combinations of oxide of mercury with, **12**, 27.
 Antimony oxychlorides, **25**, 122.
 Antimony salts, osmose of, **8**, 92.
 Antimony sulphide, **11**, 89.
 Apatite, **24**, 1180.
 — crystalline form of, **25**, 56.
 — solubility of, in carbonic acid water, **28**, 270.
 Apo, meaning of, as prefix, **25**, 652.
 Apocrenic acid in mineral waters, **24**, 921.
 Apomorphine, constitution of, **25**, 506.
 Apophyllates, **5**, 267.
 Apophyllic acid, **5**, 266.
 Aporetin, action of nitric acid on, **10**, 306.
 Apparatus for general fractional distillation in carbonic acid gas, **13**, 121.
 Aqua regia, **1**, 340.
 Aqueous vapour, Regnault's table of the elasticity of, **21**, 119.
 Arabin, **8**, 307.
 Arachinic acid, **8**, 279.
 Arbutin, constitution of, **24**, 960.
 Archil, substances contained in the lichens used for preparation of, **1**, 71.

- Argemone Mexicana*, oil of, **24**, 154.
 Argento-benzo-sulphophenylamide, **6**, 196.
 Argento-hypoxanthine, behaviour of, with gelatin, **25**, 257.
 Arms, analysis of ancient, **4**, 273.
 Aromatic acids, isomerism of, **24**, 363.
 Aromatic additive compounds, **25**, 1908.
 Aromatic amido-derivatives, direct formation of, **25**, 149.
 Aromatic azodiamines, colouring matters derived from, **25**, 826.
 Aromatic compounds, determination of the relative positions of the substituted radicals in, **24**, 679, 824.
 Aromatic cyanates, **24**, 138.
 Aromatic glycols, **25**, 816.
 Aromatic hydrocarbons, **25**, 437.
 ——— new series of, **24**, 508, 688.
 ——— having lateral chains, oxidation of, **25**, 815.
 ——— products of oxidation of, **25**, 619.
 ——— formation of phenols from, **25**, 481.
 ——— and their derivatives, refraction-equivalents of, **25**, 147.
 Aromatic liquid obtained by decomposing chlorophosphuret of nitrogen with alcohol, **3**, 362.
 Aromatic monamines, secondary, **25**, 1025.
 ——— synthesis of, by intramolecular atomic interchange, **25**, 1021.
 Aromatic nitro-compounds, formation of, in alcoholic solution, **24**, 222.
 Aromatic phosphines, **25**, 422.
 Arragonite, on a specimen of artificial, **1**, 9 (p).
 Arragonite and calc-spar, heat disengaged in the decomposition of, **6**, 239.
 Arrows, poison obtained from, **11**, 151.
 Arsammunium compounds, **14**, 339.
 Arsenate of didymium, **6**, 267.
 Arsenate, hydrated plumbo cupric (bayldonite), from Cornwall, **18**, 265.
 Arsenate of lime and ammonia, **11**, 10.
 ——— of magnesia and ammonia, **11**, 13.
 Arsenates, specific heat of, **19**, 201, 228.
 ——— volumes occupied by, **11**, 103.
 Arsenates of baryta, lime, and magnesia, **11**, 6.
 Arsenbiethyl, or vinoecodyl, **7**, 261.
 Arsenbiethyl iodide, **7**, 262.
 Arsenethylium, **7**, 266.
 Arsenethylium chloride, **7**, 267.
 ——— iodide, **7**, 267.
 ——— oxide, **7**, 266.
 ——— sulphate, **7**, 268.
 Arsenethyls, or arsenides of ethyl, **7**, 258.
 Arsenic from alkali works, **25**, 1132.
 Arsenic in hydrogen sulphide, **24**, 889.
 ——— detection of, in copper, **14**, 295; **16**, 247.
 ——— detection of, by electrolysis, **13**, 14, 338.
 ——— detection of, for pharmaceutical purposes, **25**, 327.
 ——— detection and estimation of, **11**, 129.
 ——— estimation of, as ammonio-magnesian arsenate, **24**, 589.
 ——— estimation of, as arsenious sulphide, **25**, 587.
 ——— estimation of, in commercial copper, **12**, 293.
 ——— estimation of, as uranic pyroarsenate, **24**, 593.
 ——— gravimetric estimation of, **24**, 586.
 ——— volumetric estimation of, **24**, 953.
 Arsenic, evil effects of the use of, in certain green colours, **25**, 1143.
 ——— reaction of, with magnesium, **20**, 127.
 ——— use of magnesium in Marsh's test for, **25**, 1042.
 ——— manufacture of aniline colours without, **25**, 938.
 ——— metallic, fusion of, **25**, 1075.
 ——— modification of the reactions of, by citric acid, **10**, 116.
 ——— purification of sulphuric acid from, **8**, 258; **15**, 52.
 ——— separation of, from antimony, **1**, 388; **11**, 16; **25**, 177.
 ——— separation of, by heat, from arsenetted hydrogen in Marsh's apparatus, **25**, 1042.
 ——— separation of, from other elements, **11**, 6.
 ——— separation of, as sulphide, **11**, 130.
 ——— solubility of, **11**, 20.
 ——— source of, in the sulphuric acid of commerce, **15**, 52.
 ——— specific gravity and atomic volume of, **11**, 61.
 ——— symbol of, in Brodie's chemical calculus, **21**, 421.
 Arsenic acid, atomic volume and specific gravity of, **11**, 82.
 ——— behaviour of, to hydrochloric acid, **24**, 661.
 ——— action of hydrochloric acid on sulphide of mercury in presence of, **12**, 159.
 ——— ethers of, **24**, 817.
 ——— neutralisation of, by potash, **11**, 68.
 Arsenic compounds, organic; their formation, **13**, 188, 190.
 ——— properties of, **13**, 213.
 Arsenic pigments, yellow and red, **25**, 268.

- Arsenic sulphide, **111**, 89.
 Arsenic, sulphides of, **25**, 599.
 Arsenic and arsenious anhydrides, reaction of phosphorous chloride on, **24**, 491.
 Arsenic and copper, sulphide of, **12**, 9.
 Arsenic and sulphur, minerals from Chile containing, **12**, 8.
 Arsenic, tin, and antimony, qualitative separation of, **4**, 329; **5**, 210.
 ——— detection and qualitative separation of, **5**, 101.
 Arsenical pyrites of Reichenstein, formula of, and percentage of gold in, **24**, 203.
 Arsenides, specific heat of, **19**, 196, 225.
 Arsenides of ethyl, or arsenethyls, **7**, 288.
 Arsenious acid, action of, on albumin, **3**, 11.
 ——— action of, on the carbonates of potassium and sodium, **15**, 281.
 ——— action of chlorine on, **18**, 62.
 ——— atomic volume and specific gravity of, **111**, 82.
 ——— capacity of, for bases, **15**, 281.
 ——— compounds of, with albumin, **4**, 178.
 ——— separation of, from colloidal liquids, **15**, 261.
 ——— occurrence of prismatic, **21**, 179.
 ——— in the soil, effect of, on the growth of barley and turnips, **14**, 225.
 ——— and its salts, volumetric estimation of, **8**, 236.
 Arsenious acid and sulphate of indigo, comparative action of ozone upon, **25**, 979.
 Arsenious ethers, **24**, 817.
 Arsenious sulphide, precipitation of, **11**, 131.
 ——— purification and quantitative determination of, **11**, 131.
 ——— reduction of, **11**, 132.
 Arsenite of ammonium, **15**, 297.
 ——— of barium, **15**, 294.
 ——— of copper, **15**, 292.
 ——— of lead, **15**, 291.
 ——— of magnesium, **15**, 294.
 ——— of silver, **15**, 290.
 ——— of zinc, **15**, 296.
 Arsenites, volumetric estimation of, **8**, 236.
 Arseniethyl, **7**, 263.
 Arseniethyl chloride, **7**, 266.
 Arseniethyl iodide, **7**, 265.
 Arseniethyl nitrate, **7**, 266.
 Arseniethyl oxide, **7**, 263.
 Arseniethyl sulphide, **7**, 264.
 Arsides, metallic, **12**, 92.
 Arsines, not acted on by carbon bisulphide, **12**, 309.
 Arsines and stibines, behaviour of, with the sulphocyanates of phenyl and allyl, **12**, 321.
 Arterial system, causes of variation in the proportion of oxygen in the, **25**, 253.
 Artesian well at Rochefort, **24**, 1181.
 Artificial light, effect of, on coal-tar colours, **14**, 254.
 Asafetida, oil of, **1**, 48.
 Ash of the cabbage, **24**, 1208.
 ——— of the cactus, **3**, 57.
 ——— of coffee and chicory, **9**, 44, 45.
 ——— of the seed of *Hyoscyamus niger*, **25**, 263.
 ——— of lemon-juice, **7**, 44.
 ——— of tobacco, **11**, 192.
 ——— of wheat-grain, **10**, 17.
 Ash-analysis, quantitative, **11**, 184.
 Ash-constituents of the seeds of the Egyptian *Acacia nilotica* and *Hibiscus esculentus*, **24**, 429.
 Ashes of seeds and roots, analyses of, **9**, 46.
 ——— of some esculent vegetables, analysis of the, **2**, 4.
 ——— rich in alkaline and earthy carbonates, **11**, 183, 186.
 ——— rich in alkaline and earthy phosphates, **11**, 184, 186.
 ——— rich in silica, **11**, 184.
 Ashes, vegetable, carbonic acid in, **111**, 90.
 ——— inorganic compounds in normal, **9**, 46.
 ——— preparation of, **11**, 184.
 Ash-tree, manna from the, **25**, 813.
 Asparagine, formation of, in vetches, **25**, 516.
 ——— oxidation of, **21**, 162.
 Asparagine and aspartic acid, **1**, 342.
 Asparagus, analysis of, **2**, 9.
 Aspartic acid, active and inactive, **5**, 63.
 ——— formation of, from binnate of ammonia, **3**, 187.
 ——— occurrence of, among the decomposition-products of proteids, **24**, 721.
 ——— products obtained from, **24**, 129.
 Aspartic acid and asparagine, **1**, 342.
 Aspartic and malic acids, **5**, 62.
Asperula odorata, crystals from, **111**, 206.
 Aspirators, **4**, 186; **29**, 161.
 Assay-balance, improved, **45**, 36.
 Assaying, certain sources of loss of precious metal in some operations of, **13**, 97.
 Assays of gold and silver bullion, manipulation of, **23**, 366.
 Astracante from Stassfurt, **25**, 125.

- Atacamite, **18**, 80.
 ——— action of heat on, **9**, 140.
 ——— composition of a specimen of, from the province of Copiapo, Chile, **7**, 193.
 Atacamite crystals from South Australia, **24**, 1180.
 Atacamite group, notes on a Cornish mineral of the, **18**, 212.
Atherosperma moschatum, oil of, **17**, 5; **25**, 12.
 Atlantic ocean, composition of the water of, **23**, 145.
 Atomolysis, **17**, 350.
 Atmoppyre, **11**, 31.
 Atmosphere, daily observations at Ros-tock on the amount of carbon dioxide in the, **25**, 668.
 ——— detection of organic and other nitrogenised matter in the, **25**, 1040.
 Atmosphere of dwelling-houses, some chemical facts respecting the, **10**, 251.
 Atmosphere, solar, chemical analysis of, **13**, 287.
 Atmospheric air, action of electric discharges on, **13**, 363.
 ——— ——— composition of, **25**, 33.
 ——— ——— extraction of oxygen gas from, **5**, 260.
 Atmospheric deposits, contribution to the chemistry of, **25**, 786.
 Atmospheric ozone, **25**, 976.
 Atmospheric pressure, influence of, on the light of combustion, **15**, 177.
 ——— ——— influence of, on the rate of combustion, **15**, 170.
 ——— ——— influence of, on some of the phenomena of combustion, **15**, 168.
 Atomic heat, **22**, 357.
 Atomic heat and atomic weight or composition, relations between, **19**, 203.
 Atomic motion, **4**, 110.
 Atomic theory, **22**, 328, 433.
 Atomic values, **22**, 351.
 Atomic volume, **11**, 401; **111**, 57.
 Atomic volume and specific gravity, researches on, **1**, 121.
 ——— ——— and specific gravity, table of, **1**, 137.
 Atomic volumes and boiling points of analogous organic liquids, **1**, 363.
 Atomic weight of carbon, **11**, 129.
 ——— ——— of molybdenum, **1**, 393.
 Atomic weights of cobalt and nickel, **16**, 51; **22**, 294; **24**, 1006.
 ——— ——— of elements, **15**, 390.
 ——— ——— of oxygen and water, **11**, 107.
 ——— ——— relations between, **24**, 884.
 ——— ——— revision and more exact determination of, **1**, 15 (p).
 Atomicities, classification of the elements in relation to their, **17**, 211.
 Atomicity of elements, dynamical meaning of, **25**, 378, 614.
 Atomicity of sodium, **22**, 199.
 Atoms, theory of the linking of, **24**, 331.
 Atropine, distribution of, in the leaves and root of Belladonna, **25**, 908, 1101.
 Attar of roses, **25**, 937.
 Attraction, capillary, phenomena of, observed with chloroform, bisulphide of carbon, and other liquids, **1**, 174.
 Auric nitrate and sulphate, stability of, **25**, 285.
 Aurine, **24**, 166; **25**, 74.
 Aurora borealis, spectrum of, **25**, 119, 1061.
 Auro-sulphuret of potassium, **1**, 244.
 Auro-sulphuret of sodium, **1**, 238.
 Automatic thermo-regulator, **24**, 639.
 Autumnal foliage, tints of, **24**, 184.
 Autunite, **19**, 135.
 Average specific gravity of heterogeneous liquids, determination of, **19**, 456.
 Avogadro's law, **24**, 300.
 Azelaic acid, action of caustic baryta on, **17**, 261.
 Azobenzene, formation of, **25**, 693.
 Azobenzene and benzidine, **8**, 292; **14**, 60.
 Azo-compounds of resorcin, **24**, 830.
 Azodiamines, colouring matters derived from the aromatic, **25**, 695, 826.
 Azodinaphthylcitraconamic acid, **16**, 216.
 Azodinaphthylldiamine, action of acids on, **16**, 211.
 ——— action of benzoyl chloride on, **16**, 211.
 ——— action of nascent hydrogen on, **18**, 173.
 ——— preparation of, **16**, 210.
 Azodiphenyl blue, **25**, 695.
 Azophenylene, **25**, 694.
 Azophenylene from para-azobenzoic acid, **25**, 896.
 Azophosphate of aluminium, **3**, 147.
 ——— of ammonium, **3**, 152.
 ——— of barium, **3**, 149; **17**, 236.
 ——— of copper, **3**, 147; **17**, 235.
 ——— of iron, **3**, 142; **17**, 234.
 ——— of iron with ammonia, **3**, 146.
 ——— of lead, **3**, 149.
 ——— of mercury, **3**, 149.
 ——— of potassium, **3**, 151.
 ——— of silver, **3**, 148.
 ——— of zinc, **17**, 236.
 Azophosphates, composition of, **3**, 153.
 Azophosphoric acid, **3**, 142; **17**, 229, 234.

Azophosphoric acid, tabular view of the properties of, and of phosphoric and deutazophosphoric acids, **3**, 365.
 Azorite from San Miguel, crystalline form of, **25**, 56.
 Azotimeter, **25**, 322.
 Azotised organic compounds, synthesis of, **17**, 48.
 Azuline, **14**, 249.
 — dyeing of silk with, **14**, 251.
 Azulmic acid, constitution of, **25**, 250.
 Azulmoxin, **25**, 250.
 Azurite, formation of, **24**, 201.

B.

Babingtonite, **24**, 506, 1180.
 Babingtonite from Herbornseelbach in Nassau, **25**, 293.
 Bacteria, **25**, 641.
 — pretended transformation of, into alcoholic ferments, **25**, 261.
 Balance galvanometer, **2**, 26.
 Ball soda or black ash, its composition and analysis, **11**, 155.
 Barbaloin, action of nitric acid on, **25**, 488.
 Barium, amount of, in certain minerals, **24**, 1177.
 — estimation of sulphur by, **24**, 1085.
 — notes on, **8**, 291.
 — a reaction of, **25**, 923.
 — specific gravity and atomic volume of, **11**, 63.
 — spectrum produced by, **13**, 284.
 Barium acetate, diffusion of, **4**, 91.
 — acetoxybenzamate, **13**, 240.
 — amidobenzoate, **9**, 269.
 — amylphosphate, **9**, 138.
 — anchoate, **10**, 170.
 — anisoate, **9**, 187.
 — apophyllate, **5**, 267.
 — arsenate, **11**, 8.
 — arsenite, **15**, 294.
 — azophosphate, **3**, 119.
 — bassiate, **2**, 236.
 — benzoylecollate, **5**, 77.
 — bibromacetate, **11**, 28.
 — bromacetate, **11**, 23.
 — bromocoumarilate, **24**, 49.
 — caproate, action of heat on, **3**, 215.
 — chlorate, preparation of, **25**, 599.
 — chloride, diffusion of, **4**, 91.
 — — osmose of, **8**, 71.
 — chromate, **25**, 385.
 Barium cobaltcyanides, **24**, 389.
 — — comenates, **4**, 366.
 — — coumarilate, **24**, 47.
 — — double cyanides containing, **24**, 389.
 — — deutazophosphate, **3**, 359.
 — — diazo-amidobenzoate, **18**, 301.
 — — diazoamidocouminate, **18**, 317.
 — — diazo-amidotoluylate, **18**, 316.
 — — diethoxalate, **22**, 35.
 — — dinitroethylate, **11**, 86.
 — — disulphanilate, **9**, 260.
 — — disulphetholate, **9**, 251.
 — — disulphocoumarilate, **24**, 53.
 — — disulphopropiolate, **9**, 253.
 — — ethylmeconate, acid, **6**, 74.
 — — ethylphosphates, **7**, 219.
 — — ethyltrithionate, **10**, 59.
 — — glyceritricarballylate, **18**, 336.
 — — hydrate, action of boric acid on, at a red heat, **14**, 147.
 — — — crystallised, **13**, 48.
 — — — osmose of, **8**, 84.
 — — — action of silicic acid on, at a red heat, **14**, 150.
 Barium hydropiperate, **15**, 23.
 — — hydrosulphate, compound of mustard oil with, **8**, 186.
 — — hypochlorite, decomposition of a solution of hydrogen peroxide by, **16**, 324.
 — — hypogreate, **8**, 281.
 — — hyposulphamylate, **1**, 376; **3**, 159.
 — — hyposulphethylate, **1**, 47.
 — — hyposulphite, **23**, 427.
 — — insolinate, **9**, 212.
 — — leucate, **14**, 310.
 — — malate, **1**, 34.
 — — metaphosphate, **11**, 278.
 — — methylidithionate, **10**, 246.
 — — nitrate, diffusion of, **4**, 90.
 — — nitrobenzoate, action of heat on, **19**, 369.
 — — nitrocoocussate, **11**, 474.
 — — nitrotoluylate, **11**, 432.
 — — oenanthylate, **1**, 4.
 — — oxalate, acid, **5**, 223.
 — — palmate, **11**, 225.
 — — peroxide, **11**, 84.
 — — — action of, on acetic anhydride, **21**, 497.
 — — — action of iodine on, **4**, 211.
 — — — action of, on silver chloride, **4**, 203.
 — — — preparation of, **4**, 201; **17**, 267; **25**, 880.
 — — — reduction of metallic oxides by, **7**, 304.
 Barium phosphite, **20**, 359.
 — — piperate, **15**, 18.
 — — platimotereyanide, **7**, 31.
 — — pyromecconate, **6**, 79.

- Barium pyrophosphotriamates, **19**, 6.
 — pyrovanadate, **2**, 33.
 — selenites, **2**, 59.
 — sorbate, **12**, 47.
 — sulphacetate, **9**, 217.
 — sulphamilate, **9**, 260.
 — sulphanisate, **10**, 214.
 — sulphate, retardation of the precipitation of, in presence of nitric acid and ammonia, **25**, 1113.
 — — solubility of, in hydrochloric acid, **9**, 15.
 Barium sulphide, compound of mustard oil with, **8**, 186.
 — sulphobenzoate, **9**, 255.
 — sulphobutyrate, **9**, 253.
 — sulphocaprylate, **7**, 287.
 — sulphocoumarilate, **24**, 51.
 — sulphocyanate, **4**, 19.
 — sulphopropionate, **9**, 253.
 — tartanilate, **8**, 181.
 — tolylate, **III**, 429.
 — valerate, **24**, 1045.
 Barium and cadmium, chloride of, **8**, 254.
 Barium and strontium, action of boric acid on the carbonates of, **12**, 188.
 Bark of *Juglans cinerea*, **25**, 909.
 Bark, Peruvian, method of determining the amount of alkaloids in, **24**, 1217.
 Barley, effect of arsenious acid in the soil on the growth of, **14**, 225.
 — effect of baryta and strontia in the soil on the growth of, **14**, 227.
 — sown in rocks of various ages, produce obtained from, **7**, 289.
 — variation of the proportion of potash and soda present in certain samples of, grown in ground artificially impregnated with one or other of those alkalis, **3**, 9.
 Barley-plant, observations relative to the life of the, **24**, 578.
 Barometer, description of an hermetically sealed, **13**, 7.
 Barometric pressure, influence of changes of, on the phenomena of life, **25**, 83, 1029.
 Baryta, action of, on salicylic ether, **2**, 28.
 — action of, on suberic and azelaic acids, **17**, 258.
 — anhydrous, specific gravity and atomic volume of, **III**, 84.
 — caustic, and barium sulphide, preparation of, **25**, 187.
 — compound of, with boric methide, **15**, 380.
 — heat disengaged in combination of acids with, **6**, 217.
 Baryta, occurrence of, in silicates, **24**, 674.
 — prevention of the precipitation of, by citric acid, **10**, 112.
 — recovery of sugar from molasses by, **25**, 185.
 — in the soil, effect of, on barley and turnips, **14**, 227.
 — volumetric estimation of, **24**, 436.
 Baryta and lime, action of anhydrous, on chloraniline, **II**, 284.
 Baryta-glasses, **25**, 336.
 Baryta-water, action of bromine on, **15**, 479.
 Basalt, devitrification of, **21**, 257.
 Base, new, from extract of meat, **24**, 716.
 Base, organic, from sugars, **25**, 691.
 Bases derived from ammonia, synoptic view of, **3**, 308.
 Bases of the amyl series, **4**, 322.
 Bases, anhydrous, heat disengaged in combination of acids with, **6**, 246.
 Bases derived from aniline and ammonia, relation of, to other groups of alkaloids, **3**, 303.
 Bases containing antimony, **5**, 66.
 Bases, arsenic-, nitrogen-, and phosphorus-, comparison between, **11**, 76.
 Bases of the methyl series, **4**, 320.
 Bases, $C_nH_{2n-7}.H_2N$, formation of secondary monamines by the action of, on naphthylamine hydrochloride, **24**, 1059.
 Bases, natural organic, considered as derivatives of ammonia, **11**, 265, 267.
 Bases, organic, periodides of, **18**, 99; **19**, 145.
 Bases, oxyethylenic, **15**, 405.
 Bases, phosphorus-, **13**, 289.
 Bases, pyrrol-, **5**, 51, 55.
 Bases, separation of salts of different, by diffusion, **3**, 266.
 Bases soluble in water, heat of neutralisation of, **24**, 473.
 Bases and sulphates, alkaline, thermic researches on the electrolysis of, **25**, 110.
 Bases, volatile organic, researches on, **1**, 159, 269, 285; **2**, 36, 300; **3**, 279; **4**, 304.
 Bases, volatile, produced by the destructive distillation of the bituminous shale of Dorsetshire, **7**, 97.
 Basic carbonates of copper, **14**, 70.
 Basic derivatives of ammonia constructed on the water-type, **11**, 270.
 Basic persulphate of iron from Chile, **14**, 156.
 Basic products obtained by the decomposition of vegetable alkaloids, **6**, 125.

- Basicity of organic acids, law of, **22**, 62.
- Bassia acid of lower melting point, **2**, 239.
- Bassia latifolia*, acids contained in the oil of, **2**, 231.
- Bassia oil, properties of, **2**, 232.
- Bassie acid, distillation of, **2**, 233.
- preparation of, **2**, 232.
- Bat, excrement of, **2-4**, 424.
- Bath, analysis of the water of the thermal spring of, **III**, 262.
- Battery, Kohlfürst's copper-zinc, **2-4**, 480.
- new form of constant, **21**, 488.
- Bauxite from the Wochein (Austria), **25**, 467.
- Bauxites of the Alpine chain, **25**, 127.
- Bay oil, **17**, 5.
- Bayldonite (hydrated plumbocuprie arsenate) from Cornwall, **18**, 265.
- Bean, kidney, influence of light on the germination of, **25**, 168.
- Beans, alkaloïds obtained from, **3**, 309, 313, 314.
- Beauxite. See Bauxite.
- Beef, juice of, **10**, 153.
- Beef-stearin, composition of, **5**, 310.
- Beef-tea and potash-salts, physiological action of, **25**, 314.
- Beer, areometric analysis of, **2-4**, 602.
- preservation of, for transport by sea, by Velten's warming process, **25**, 1142.
- Beer extract, estimation of, **25**, 928.
- Beer-yeast, cause of alcoholic fermentation by, **25**, 260.
- fatty constituent of, **2-4**, 942.
- Beers consumed in Paris, composition of, **2-4**, 1224.
- Bees-wax, optical analysis of, **2-4**, 858.
- Beet, analysis of, **2**, 16.
- Beet-root, distillation of, **2-4**, 433.
- distribution of mineral substances in, **2-4**, 853.
- results of manures applied to, **2-4**, 854.
- rubidium in, **25**, 908.
- Belfast iron ore, analysis of, **16**, 389.
- Belladonna, distribution of atropine in the leaves and root of, **25**, 908.
- Benzamarone, **2-4**, 540.
- Benzamic acid, preparation of, **9**, 264.
- Benzamide, action of nitrous ether on, **25**, 303.
- Benzamide-chloral, **25**, 611.
- Benzamide, trichloro-, **25**, 715.
- Benzene, action of sulphur on, **2-4**, 219.
- compound obtained from, by the action of iodine chloride, **7**, 244.
- constitution of, **25**, 437, 613, 619.
- Benzene, constitutional formula of, **22**, 361.
- dynamical hypothesis as to the constitution of, **25**, 614.
- formation of phenic and benzoic acids from, **16**, 76.
- metamorphoses of, **4**, 53.
- physical characters of, **11**, 260.
- practical mode of preparing, **1**, 264.
- preparation of, from coal naphtha, **1**, 257.
- purification of, **2-4**, 219.
- question as to the number of isomeric bi-derivatives of, **25**, 613.
- theoretical considerations and historical notes on the constitution of, **25**, 612.
- useful properties of, **1**, 261.
- Benzene derivatives, notes on, **25**, 622.
- ——— researches on the constitution of, **2-4**, 686, 824; **25**, 692.
- Benzene series, isomerism in the, **2-4**, 680.
- ——— products of the action of dilute nitric acid on some hydrocarbons of the, **1-4**, 54.
- ——— toxicology of the, **2-4**, 1078.
- Benzene, sulpho-acids of, **25**, 1016.
- Benzene tetrachloride, **2-4**, 1040.
- Benzene, tri-substitution derivatives of, **25**, 239.
- Benzene vapour, absorption of, by charcoal, **18**, 289.
- Benzene-disulphonic acid, **25**, 623.
- Benzene-sulphonic acid, **2-4**, 556.
- Benzene-sulphonic acid from sulphanilic acid, **2-4**, 826.
- Benzenes, twice-substituted, constitution of **2-4**, 825.
- Benzhydrol, **19**, 289.
- Benzhydroxamic acid, **25**, 414.
- Benzhydryl-benzoic acid, **2-4**, 689.
- Benzidine, derivatives of, **25**, 503.
- diethylated and tetrethylated, **1-4**, 63.
- Benzidine and azobenzene, **1-4**, 60.
- Benzile, formation of benzoic acid by oxidation of, **25**, 63.
- Benzoate of allyl, **10**, 322.
- Benzoate of ethyl-salicyl, **7**, 61.
- Benzoate of isopropyl, **25**, 237.
- Benzoate of methyl-salicyl, **7**, 61.
- Benzoate of sycoeceryl, **15**, 74.
- Benzoate of thallium, **17**, 131.
- Benzoate of tolylene, **25**, 817.
- Benzoates, ethylic and methylic, oxidation of, **20**, 131.
- Benzochlorhydrin, **7**, 284.
- Benzoglycollates, **5**, 75—79.
- Benzoglycollic acid, products of decomposition of, **5**, 79.

- Benzoglycollic ether, **5**, 78.
 Benzoic acetate, **5**, 227.
 Benzoic acid, **11**, 342.
 — action of iodine chloride on, **17**, 332.
 — action of nitric acid on, **18**, 322.
 — action of phosphorous chloride and bromine on, **24**, 552.
 — action of potash on, **25**, 1013.
 — alcohol corresponding with, **7**, 192.
 — anhydrous, **5**, 129, 227.
 — attempt to obtain the acids homologous with, from the corresponding hydrocarbons, **7**, 245.
 — conversion of, into hippuric acid in the animal economy, **1**, 79; **1**, 22 (p).
 — formation of, by the action of nitrous acid on diazo-amidobenzoic acid, **18**, 310.
 — formation of, from anthraquinone, **25**, 445.
 — formation of, from benzene, **16**, 76.
 — formation of, by oxidation of stilbene and of benzile, **25**, 63.
 — in gas water, **25**, 1097.
 — homologue of, **14**, 52.
 — simultaneous action of sulphuric and nitric acids on, **18**, 325.
 Benzoic alcohol, **8**, 619.
 Benzoic aldehyde, formation of, by oxidation of stilbene, **25**, 63.
 Benzoic cinnamate, **5**, 227.
 Benzoic cuminate, **5**, 228.
 Benzoic ether, action of sodium alcoholate on, **25**, 244.
 Benzoic pelargonate, **6**, 187.
 Benzoic salicylate, **5**, 129.
 Benzoic series, extension of the acrylic form of acids to the, **18**, 154.
 — isomerism in the, **25**, 708.
 Benzoic valerate, **6**, 185.
 Benzoïn, **24**, 536.
 Benzoïn series, contributions to the history of the, **25**, 63.
 Benzol or Benzole. See Benzene.
 Benzol, crude, hydrocarbons contained in, **19**, 356.
 Benzolactic acid, **5**, 82.
 Benzonitrile, action of sulphuric acid on, **9**, 255.
 — preparation of, **9**, 254.
 Benzophenone, two modifications of, **24**, 832.
 Benzophenone-sulphonic acid, **25**, 406.
 Benzopiperidine, **6**, 178.
 Benzosalicylamide, **6**, 196.
 Benzotartaric ether, action of alcoholic potash on, **20**, 141.
 Benzotartaric ether, formation of, **20**, 140.
 Benzotartarate of ethyl and hydrogen, **20**, 142.
 Benzoycin, **6**, 286.
 Benzoyl and anisyl compounds, table of, **4**, 68.
 Benzoyl chloride, action of potassium sulphhydrate on, **24**, 900.
 — action of, on tartaric and paratartaric ethers, **20**, 138.
 — use of, as a test for alcohol, **24**, 1093.
 Benzoyl chloride and aldehyde-ammonia, compound produced from, **9**, 265.
 Benzoyl compounds, **9**, 268.
 — table of, **4**, 45.
 Benzoyl derivatives of hydroxylamine, **25**, 414.
 Benzoyl dioxide, and its reaction with amylene, **24**, 1041.
 Benzoyl hydride, absorption of its vapour by charcoal, **20**, 162.
 — action of acetic anhydride on, **20**, 589.
 — action of liquid phosgene on, **24**, 342.
 — formation of, **9**, 266.
 Benzoyl nitride, formation of, from hippuric acid, **7**, 191.
 Benzoyl peroxide, **17**, 268.
 Benzoyl sulphocyanate, **9**, 264.
 Benzoyl-azodinaphthylhydramine, **16**, 215.
 Benzoyl-benzoic acid, **24**, 689.
 Benzoyl-chrysammic acid, **19**, 322.
 Benzoyl- α -nitrosulphotolulol-aciamide, chloride of, **25**, 413.
 Benzoyl- β -paranitrosulphonaphthalenamide, **25**, 148.
 Benzoyl- β -paranitrosulphotoluolamide, **25**, 147.
 Benzoylsulphobenzol-aciamide, chloride of, **25**, 413.
 Benzoylsulphocymol-aciamide, chloride of, **25**, 413.
 Benzoyl- α -sulphonaphthalen-aciamide, chloride of, **25**, 414.
 Benzoyl-sulphotoluol-aciamide, chloride of, **25**, 413.
 Benzoyl-urea, **8**, 160.
 Benzyl alcohol, action of cyanogen chloride on, **24**, 926.
 — action of urea-nitrate on, **24**, 928.
 — homologue of, **15**, 62.
 Benzyl carbamate, **24**, 927.
 Benzyl chloride, action of, on gaultherate of sodium, **21**, 124.
 — action of, on the hydride of sodium-salicyl, **21**, 122.
 Benzyl derivatives of the salicyl series, **21**, 122.

- Benzyl ethers, **24**, 909.
 Benzyl isocyanate and isocyanurate, **25**, 446.
 Benzyl ketones, oxidation-products of the, **25**, 821.
 Benzyl salicylates, **21**, 126.
 Benzylacetamide, **25**, 1027.
 Benzylamine cyanide, **25**, 1026.
 Benzylamine, derivatives of, **25**, 1026.
 Benzylated anisol, **25**, 703.
 Benzylated phenol, **25**, 702.
 Benzylbenzene, **24**, 508, 688.
 Benzylene dichloride, action of, on triethylphosphine, **14**, 343.
 Benzylene group of phosphorus-bases, **14**, 342.
 Benzylethyl-benzene, **25**, 1004.
 Benzylidene-oxamide, **24**, 151.
 Benzyl-salicyl hydride, **21**, 123.
 Benzyl-salicylic acid, **21**, 125.
 Benzyl-sulphonic acid, **25**, 490, 1017.
 Benzyl-toluene, **24**, 508, 688.
 ——— derivatives of, **25**, 1004.
 Benzyl-ureas, **24**, 928 ; **25**, 448.
 Berberine, history of, and revision of its formula, **15**, 339.
 ——— preparation of, from *Coscinium fenestratum*, **20**, 187.
 Berberine salts, **15**, 344—352.
 Berberine and silver, hyposulphite of, **15**, 346.
 Berberine, uses of, **15**, 356.
 Bergamot oil, **17**, 6.
 Berries, Persian, colouring matters of, **13**, 327.
 Beryl from Elba, **25**, 795.
 Beryllium platinochloride, **24**, 202.
 Beryllium, platinocyanides and tartrates of, **24**, 1013.
 Bessemer flame, optical examination of, **24**, 97, 98.
 Bessemer steel, **25**, 1144.
 Betaine of the phosphorus series, **24**, 1066.
 Beta-nitrobenzoic acid, **18**, 323, 326.
 Beyrichite and Millerite, **24**, 1176.
 Biamidobenzoic acid, **9**, 271.
 Bibasic and monobasic acids, distinctions between, **11**, 127.
 Bibromacetate of ethyl, **12**, 6.
 Bibromacetates, metallic, **11**, 28 ; **12**, 4.
 Bibromacetic acid, **11**, 28 ; **12**, 1.
 Bibromide of heptylene, **16**, 220.
 Bibromide of hexylene, **16**, 229.
 Bibromosuccinates, **13**, 104.
 Bibromosuccinic acid, **13**, 102.
 Bicarbonate of ammonia of the China Isles, **16**, 74.
 Bicarbonate of diplatossamine, **5**, 220.
 Bicarbonate of potassium, neutralisation of, by potash, **11**, 68.
 Bicarbonate of stibmethylum, **5**, 68.
 Bicarbonates, alkaline, diffusion of, **4**, 103.
 Bichloramyl nitrite, **11**, 249.
 Bichlorethylene chlorosulphide, **13**, 40.
 Bichloride of anthracene, **15**, 51.
 Bichloride of platinum, products of the decomposition of narcotine by, **11**, 163, 168.
 Bichloride of tin, preparation of fuchsin by the action of, on aniline, **14**, 237.
 Bichloride of tin, action of, on mercuric ethyl, **16**, 21.
 Bichloride of titanium, action of, on stannic diethyl, **16**, 23.
 ——— compound of, with hydrocyanic acid, **3**, 178.
 Bichloruretted salicylic ether, **3**, 78.
 Bichromate of ammonia, double compound of, with mercuric chloride, **3**, 202.
 Bichromate of berberine, **15**, 348.
 Bichromate of potassium and metallic tin, quantitative ratio of, **4**, 246.
 ——— neutralisation of, by potash, **11**, 64.
 Bicyanide of amylene, **14**, 137.
 Biethylneconic acid, **6**, 77.
 Bilberries, fermentation of, **25**, 906.
 Bile, colourless, **25**, 513.
 ——— diagram exhibiting the decomposition of, **14**, 120.
 ——— blue colouring matter in, **24**, 1204.
 ——— its power of emulsifying fatty acids, **15**, 416.
 ——— putrefaction of, **14**, 118.
 ——— urea a normal constituent of, **24**, 423.
 Bile, human, physiology of, **25**, 1105.
 ——— putrefaction and analysis of, **14**, 127.
 Bile of the ox, analysis of putrid, **14**, 126.
 ——— chemical examination of the, **1**, 92, 413.
 Bile-acids, compounds of alkaloids with, **25**, 829.
 ——— in urine, modification of Pettenkofer's test for, **25**, 334.
 Bile-pigment, reducible by-product of the oxidation of, **25**, 308.
 Bile-pigments, **24**, 419 ; **25**, 638.
 Biliary concretion, analysis of a, **20**, 455.
 Bilirubin, conversion of, into urinary colouring matter, **25**, 514, 835.
 Biliverdin, relation of, to chlorophyll, **20**, 458.
 ——— preparation of, **20**, 455.
 Bimalate of ammonia, formation of aspartic acid from, **3**, 187.

- Dimethyl-acetal, existence of, in crude wood-spirit, **17**, 223.
 Biniodacetamide, **13**, 6.
 Biniodacetate of ethyl, **13**, 5.
 Biniodacetates, metallic, **13**, 2—4.
 Biniodacetic acid, **13**, 1.
 Biniodide of mercury, change of colour in, **1**, 85.
 Biniodide of trimethylstibine, action of zinc-methyl on, **13**, 119.
 Biniodoberberine, **15**, 352.
 Binitranisidine, **3**, 76.
 Binitranisol, **3**, 74.
 Binitrobenzamide, **9**, 271.
 Binitrobenzoate of ethyl, **9**, 270.
 Binitrobenzoic acid, **9**, 270.
 Binitrophenetol, **3**, 78.
 Binitrosalicylic ether, **3**, 78.
 Binitroxanthracene, **15**, 49.
 Binitroxide of amylene, **13**, 46, 130.
 Binoxalate of potassium, **11**, 66.
 Binoxide of nitrogen, action of zinc-ethyl on, **11**, 80.
 ——— action of zinc-methyl on, **11**, 88.
 Binoxide of sodium. See Sodium Bin-oxide.
 Binoxide of tin, crystallised, **10**, 119.
 Bioxysulphocarbonate of amyl, action of ammonia on, **5**, 142.
 Biphosphamide, **2**, 126.
 Birch, spring period of, **25**, 170.
 Birch-bark, oil of, **17**, 7.
 Birds, chemical relations of the nuclei of the blood-corpuscles in, **24**, 740.
 Biselenide of triethyl-phosphine, **11**, 71.
 Biselenide of trimethylphosphine, **11**, 74.
 Bismethyl, **5**, 71.
 Bismuth, action of, on mercuric ethide, **17**, 36.
 ——— double salts of alkaloïds containing, **24**, 930.
 ——— detection of, by the blowpipe in presence of lead and antimony, **25**, 1118.
 ——— in copper coinage, **14**, 300.
 ——— detection of, in copper, **14**, 299.
 ——— estimation of, in commercial copper, **14**, 294.
 ——— freezing of, **21**, 71.
 ——— general distribution of, in copper minerals, **14**, 304.
 ——— modification of the reactions of, by citric acid, **10**, 116.
 ——— organic compounds of, **13**, 187, 204.
 ——— occurrence of thallium in minerals containing, **17**, 143.
 ——— refining of crude, **25**, 328.
 ——— separation of, from other metals, **25**, 328.
 Bismuth, solubility of, **11**, 20.
 ——— specific gravity and atomic volume of, **11**, 60.
 ——— melted, specific gravity and atomic volume of, **11**, 75.
 ——— symbol of, in Brodie's calculus of chemical operations, **21**, 442.
 ——— thermo-electric currents generated in elements where it is used to form the joint, **8**, 33.
 ——— thermo-electric joints formed by, with antimony and palladium, **8**, 36.
 ——— thermo-electric properties of, **10**, 77.
 Bismuth lactate, **1**, 400.
 Bismuth nitrates, preparation and analysis of, **11**, 480.
 Bismuth ores, assaying of, **25**, 328.
 Bismuth oxide, specific gravity and atomic volume of, **11**, 82.
 ——— use of, in incinerating animal and vegetable substances, **24**, 855.
 ——— compounds of, with sulphuric acid, **25**, 44.
 Bismuth sulphide, specific gravity and atomic volume of, **11**, 89.
 Bismuth sulphite, **2**, 207.
 Bismuth vanadate (native), **25**, 131.
 Bismuth and copper, reciprocal precipitation of, **9**, 291.
 Bismuth and potassium, analysis of the supposed double oxalate of, **1**, 76.
 Bismuthite from St. José in Brazil, **25**, 130.
 Bistearate of sodium in human excrements, **10**, 164.
 Bistort, examination of, **1**, 212.
 Bistriethide, formation of, **13**, 187.
 Bisulphamylene, hydrated oxide of, **12**, 121.
 ——— oxide of, **12**, 122.
 Bisulphamylic acid, identity of, with hyposulphamylic acid, **3**, 158.
 Bisulphethylic acid, identity of, with hyposulphethylic acid, **3**, 18.
 ——— produced by the action of nitric acid on the sulphocyanates of ethyl, methyl, &c., **1**, 45.
 Bisulphide of amyl, preparation of, **3**, 158.
 ——— preparation of hyposulphamylic acid from, **3**, 159.
 Bisulphide of carbon, absorption of its vapour by charcoal, **18**, 288; **21**, 189, 192.
 ——— action of, on amylamine, **13**, 60.
 ——— action of, on naphthylidiamine, **18**, 178.
 ——— action of, on various salts, **18**, 26.

- Bisulphide of carbon in coal-gas, **13**, 85.
 ———— diffusion-velocity of its vapour, **16**, 400.
 ———— its effect on the inflammability of the constituents of coal-gas, **16**, 401.
 ———— formation of acetic anhydride by its action on acetate of lead or silver, **18**, 22.
 ———— formation of phenyl acetate by its action on a mixture of phenyl alcohol and lead acetate, **18**, 24.
 ———— igniting point of, **16**, 399.
 ———— phenomena of capillary attraction observed with, **1**, 174.
 Bisulphide of chlorine, action of, on ethylene, **13**, 36.
 Bisulphide of iodine, **14**, 57.
 Bisulphide of triethylphosphine, **11**, 69.
 Bisulphide of trimethylphosphine, **11**, 74.
 Bisulphite of calcium, compound of, with glyoxalate of calcium, **18**, 194.
 Bisulphite of potassium, spontaneous decomposition of, **24**, 1167.
 Bisulphite of sodium, compound of, with glyoxylic acid, **18**, 193.
 Bisulphites, alkaline, action of several essential oils on, **5**, 317.
 ———— behaviour of some diazo-compounds to, **24**, 1196.
 ———— compounds of, with hydride of ethyl-salicyl, **20**, 423.
 ———— compounds of, with hydride of methyl-salicyl, **20**, 420.
 ———— compounds of ketones with, **8**, 154.
 Bisulphochloride of amylene, **14**, 129.
 ———— action of nitric acid on, **13**, 45.
 Bisulphochloride of chloroethylene, **13**, 37.
 Bisulphochloride of ethylene, **13**, 134; **14**, 129.
 Bitelluride of ethyl, **5**, 72.
 Bithio-bithiocyanide of amylene, **14**, 134.
 Bithiocyanide of amylene, **14**, 133.
 Bitter almond oil, action of nascent hydrogen on, **24**, 384.
 ———— detection of nitrobenzene in, **25**, 843.
 ———— estimation of nitrobenzene in, **25**, 1127.
 Bitter almond water, estimation of hydrocyanic acid in, **4**, 219.
 Biuret, **24**, 716.
 Biuret and allied compounds, **24**, 396.
 Bivanadates, **21**, 310.
 Black-ash, analysis of, **2**, 2, 217.
 ———— average composition of, **20**, 409.
 Black-ash or ball soda, composition and analysis of, **11**, 155.
 Black cummin, or *Nigella* seeds, **24**, 1067.
 Black lustre-colour for sugar paper, **24**, 170.
 Black snake-root, neutral crystallisable principle in, **24**, 409.
 Bladder and kidneys, physiology of, **25**, 633.
 Blast, hot and cold, in iron smelting, **22**, 231—243.
 Blast-furnace, chemistry of the, **22**, 203—254.
 ———— effect of mode of charging, **22**, 209.
 ———— equation representing the processes of deoxidation and carburization in the, **22**, 220.
 ———— composition of gases from the, **22**, 213, 224—231.
 ———— behaviour of lime in the, **22**, 222.
 ———— temperature of different zones in the, **22**, 206.
 ———— estimation of the temperature of the combustion-zone of the, **25**, 1134.
 ———— vaporisation of lime, alumina, magnesia, and silica in the, **22**, 231.
 Blast-furnace mixture, use of quicklime in the, **25**, 850.
 Blast-furnace slag (cinder), composition of, **15**, 314.
 Blast-furnace slags, estimation of iron in, **25**, 1117.
 Bleaching with sulphurous acid, Bailey's process of, **24**, 452.
 Bleaching-powder, action of, on the salts of copper and lead, **11**, 387.
 ———— determination of available chlorine in, **24**, 751.
 ———— examination of, **25**, 843.
 ———— estimation of the strength of, **25**, 91.
 Bleeding of birch and maple when bored in spring-time, **25**, 170.
 Blegiolite, **25**, 602.
 Blende crystals from Unkel, **25**, 130.
 Bleu de Paris, **14**, 241.
 Bleedito from Stassfurt, **25**, 294.
 Blood, absorption of gases by, **25**, 1030.
 ———— ammoniacal deposit formed in the process of drying, **18**, 340.
 ———— quantities of ammonia evolved from, by potash and by permanganates, **25**, 646.
 ———— on a fermentative action of, **25**, 1104.
 ———— analysis of the gases of, **25**, 265.

- Blood, composition of, in chyluria, **24**, 640.
- constitution of, **24**, 574, 838.
- effects produced on, by the air of towns, **11**, 224.
- separation of the colouring matter of, by a solution of tannin, **25**, 929.
- tension of the gases of the, in the pulmonary capillaries, **25**, 311.
- question as to the existence of glycogen in, **25**, 84.
- inorganic constituents of, **25**, 831.
- of an invertebrate animal, iron in the, **25**, 899.
- reaction of the, in leukaemia, **25**, 833.
- manganese in, **24**, 1074.
- changes which oxybenzoic and paraoxybenzoic acids undergo in the, **25**, 637.
- destiny of peptones in the, **25**, 254.
- influence of quinine on oxidation in the, **24**, 1202.
- of men and mammals, contributions to the knowledge of the, **24**, 736.
- Blood and urine in leukaemia, **24**, 421.
- Blood-corpuscles, chemical relations of the nuclei of, in birds and snakes, **24**, 740.
- — alteration of the white, by quinine, **25**, 254.
- Blood-fibrin, action of pepsin on, **25**, 630.
- Blood-globules, action of carbonic oxide on, **24**, 839.
- Blowpipe (combustion) for organic analysis, **17**, 49.
- Blue, a new antimony, **25**, 934.
- Blue, chinoline, **14**, 246.
- Blue colouring matter in the bile, **24**, 1204.
- Blue colouring matter of indigo, estimation of, **18**, 217.
- Blue colouring matter from eserine, **24**, 719.
- Blue fire, **24**, 970.
- Blue Forest marble, colouring matter of, **17**, 379.
- Blue produced by oxidation of *Boletus cyanescens*, *B. luridus*, &c., compared with a similar product obtained from phenol, **25**, 910.
- Blue, Prussian, preparation of, **1**, 117.
- Blue, Runge's, **22**, 26.
- Board of Health, water-supply recommended by (1851), **4**, 396.
- Boghead coal, hydrocarbons produced by destructive distillation of, **15**, 130.
- Boghead naphtha, formation of the iodides of the alcohol-radicals from, **15**, 359.
- Boilers, use of alkaline carbonates for preventing incrustation in, **3**, 13.
- Boiling point, differences of, in homologous series, **25**, 470.
- Boiling point, specific volume, and chemical composition, relations between, **3**, 104.
- Boiling points of the acetates and bromacetates of methyl, ethyl, and amyl, **11**, 27.
- Boiling points and atomic volumes of analogous organic liquids, **1**, 363.
- Boiling points of isomeric ethers, $C_nH_{2n}O_2$, **18**, 30.
- Boiling points of organic bodies, **24**, 483.
- Boiling spring, composition of a, in New Zealand, **15**, 57.
- Boleti*, oxidation-blue of, compared with a similar product obtained from phenol, **25**, 910.
- Boletus cyanescens*, chromogen of, **25**, 424.
- Bone, ground, solubility of, in carbonic acid water, **25**, 270.
- Bone-ash, solubility of phosphates of, in carbonic water, **24**, 80.
- Bone-char, estimation of calcium sulphide in, **25**, 264.
- Bone-charcoal, action of, in sugar-making, **25**, 529.
- Bone-charcoal of sugar refineries, **24**, 868.
- Bone-marrow, occurrence of hypoxanthine in normal, **25**, 1106.
- Bone-oil, distillation of, **5**, 50.
- Bones, chemical composition of, **2**, 364.
- fossil, determination of ossein in, **24**, 733.
- from guano, curious change in the composition of, **11**, 223.
- influence of food containing little or no phosphoric acid on the composition of, **25**, 1106.
- influence of different earthly phosphates mixed with the food on the composition of, **25**, 897.
- occurrence of fluorine in recent as well as fossil, **11**, 97, 134.
- testing of, for iron, **25**, 257.
- Bonnington water, analysis of, **11**, 201.
- Boric acid. See Boric acid.
- Boracite, crystallised, in the salt-beds of Stassfurt, **25**, 125.
- Borate of calcium from Tarapaca, **25**, 794.
- Borate of ethyl, action of zinc-ethyl on, **15**, 367.
- — action of zinc-methyl on, **15**, 375.
- Borate, native, **3**, 73.

- Borate of thallium, **17**, 134.
 Borates of sodium, action of, on ammonium salts, **24**, 786.
 Borates, specific heats of, **19**, 227.
 Boric acid, action of, on barium hydrate at a red heat, **14**, 147.
 ——— action of, on potassium hydrate at a red heat, **14**, 144.
 ——— action of, on sodium hydrate at a red heat, **14**, 147.
 ——— basicity of, **24**, 199.
 ——— heat evolved on addition of ammonia to solution of, **24**, 1130.
 Boric anhydride, action of phosphoric oxychloride on, **25**, 669.
 Boric dioxyethide, **15**, 370.
 Boric ethide, **15**, 367.
 Boric methide, **15**, 373.
 ——— compounds of, with potash, soda, lime, and baryta, **15**, 379.
 Bornicol, formation and reactions of, **25**, 1011.
 Bornesite, **24**, 915.
 Boron, apparent volatilisation of, **24**, 997.
 ——— series of organic compounds containing, **15**, 363.
 ——— specific gravity and atomic volume of, **11**, 91.
 ——— specific heat of, **19**, 187.
 ——— spectrum of, **24**, 1147.
 ——— symbol of, in Brodie's chemical calculus, **21**, 435.
 Boron nitride, **3**, 167.
 Boron, carbon and silicon, relations between the atomic weights of, **14**, 153.
 Botallackite, **18**, 213.
 Bournonite from Chile, **14**, 158.
 Brandy-vinegar, preparation of pure acetic acid from, **5**, 278.
 Brass, action of hydrochloric acid on, **19**, 442, 445.
 ——— action of nitric acid on, **19**, 441, 443.
 ——— action of sulphuric acid on, **19**, 447, 449.
 ——— electro-deposition of, **24**, 103.
 ——— determination of copper in, by titration, **24**, 758.
 ——— reflecting power of, for the chemical rays, **17**, 77.
Brassica, investigations on the seeds of, **25**, 520.
 Bread, examination of, for alum, **25**, 1043.
 ——— the logwood test for alum in, **25**, 923.
 ——— percentage of dry substance in, **10**, 269.
 ——— presence and detection of alum in, **10**, 103.
 Bread, wheaten, quantity of, obtained from a sack of flour, **10**, 270.
 ——— table showing the composition of, **10**, 271.
 ——— table showing the composition of, and the quantity obtained from different samples of flour, **10**, 42.
 Brewing, observations on, **1**, 23 (p).
 ——— use of glass vessels in, **24**, 868.
 Bricks, analysis of English quartz-, **25**, 1016.
 Bricks, fire-, determination of silica and titanio acid in, **15**, 316.
 Brine, dense, from Salt-springs, Nova Scotia, **18**, 46.
 Brine of salt meat, **17**, 405.
 Bristol, strontia in the well-waters of, **5**, 193.
 Brittle metals, crystalline forms of, **13**, 334.
 Brochantite, **18**, 85.
 Bromacetates, **11**, 23—27.
 Bromacetic acid, action of, on ammonia, **11**, 29.
 ——— action of bromine on, **12**, 1.
 ——— formation of, by the action of hydrobromic acid on glycollic acid, **17**, 205.
 ——— preparation of, **11**, 22.
 Bromacetanaphthylamide, **25**, 81.
 Bromacetophenone, **24**, 258.
 Bromal, and the by-products of its manufacture, **24**, 558.
 Bromallyl-ethyl ether, **25**, 479.
 Bromanil, action of sulphurous acid on, **23**, 11.
 Bromanil and chloranil, **23**, 6.
 Bromanilic acid, **23**, 12.
 Bromaniline, **11**, 290.
 ——— action of ethyl bromide on, **3**, 292.
 β -Bromaniline hydrochloride, **20**, 85.
 Bromanilphenylamide, **23**, 12.
 Bromethyl-piperidine, **24**, 1063.
 Bromethyl-triethylarsonium bromide, **14**, 336.
 Bromethyl-triethylarsonium, compounds of, **14**, 336.
 Bromethyl-triethylphosphonium aurochloride, **14**, 82.
 Bromethyl-triethylphosphonium bromide, action of ammonia on, **14**, 325.
 ——— action of diethylamine and trimethylamine on, **14**, 331.
 ——— action of ethylamine and methylamine on, **14**, 328.
 ——— action of triethylarsine on, **14**, 333.
 ——— preparation, properties, and reactions of, **14**, 78.
 Bromethyl-triethylphosphoniumplatinochloride, **14**, 80.

- Bromethyl-trimethylphosphonium, salts of, **14**, 320.
- Bromethylene-strychnine, tri-iodide of, **24**, 399.
- Bromhydranil, **23**, 11.
- Bromide of amyl, **22**, 198.
- action of, on amyl-aniline, **3**, 298.
- action of, on aniline, **3**, 297.
- action of, on diamylamine, **4**, 322.
- action of, on ethylaniline, **3**, 299.
- normal, **24**, 1034.
- Bromide of bromethyl-triethylarsonium, **14**, 336.
- Bromide of bromethyl-triethylphosphonium, **14**, 78.
- Bromide of cajputene, **14**, 68.
- Bromide of carbon, **14**, 205.
- Bromide of cyanogen, heat evolved in the formation of, **24**, 1985.
- Bromide of ethyl, action of, on amyl-aniline, **3**, 299.
- action of, on aniline, **3**, 284.
- action of, on ethylaniline, **3**, 287.
- action of, on triethylamine, **3**, 302.
- Bromide of ethylidene, **25**, 233.
- Bromide of hydrogen, action of, on nitronaphthalene, **25**, 136.
- Bromide of iodine and bromine, action of, on chloroform, **24**, 778.
- Bromide of mercury, compounds of, with the alkaloids, **11**, 97.
- Bromide of methyl, action of, on aniline, **3**, 295.
- Bromide of methyl-plumbethyl, **7**, 270.
- Bromide of oxethyl-triethylphosphonium, **14**, 84.
- Bromide, potassio-thallie, **25**, 988.
- Bromide of potassium, diffusion of, **4**, 99.
- Bromide of propyl, normal, **24**, 1032.
- Bromide of propylene, **25**, 237, 683.
- Bromide of selenethyl, **7**, 95.
- Bromide of silicon and hydrogen, **11**, 93.
- Bromide of silver, **10**, 241.
- compound of, with dibromide of ethylene-hexethyldiphosphonium, **14**, 102.
- refraction and dispersion of light in, **24**, 653.
- Bromide of sodium, compound of, with cane-sugar, **24**, 271.
- compound of, with dextro-glucose, **16**, 297.
- diffusion of, **4**, 100.
- Bromide of stibethyl, **5**, 70.
- Bromide of stibtriaryl, **9**, 284.
- Bromide of stibtriethyl, **9**, 281.
- Bromide of tellurethyl, **6**, 41.
- Bromide of thallium, **17**, 138.
- Bromide of triethylphosphine, **11**, 69.
- Bromide of trimethylphosphonium, **14**, 320.
- Bromides, action of boracic acid on, **12**, 165.
- atomic volume and specific gravity of, **11**, 440.
- volumes of, in solution, and in the solid state, **11**, 446.
- Bromides of hydrogen and the alkali-metals, precipitation of dilute silver solutions by the, **25**, 25.
- Bromides of tolylene, **25**, 817.
- Bromides of tungsten, **25**, 287.
- Brominated derivatives of acetic anhydride, **24**, 231.
- Bromine, action of, on acetic acid, **11**, 22.
- action of, on acetic aldehyde, **24**, 133.
- action of, on anthracene, **15**, 49.
- action of, on aqueous solutions of the alkalis and alkaline-earths, **15**, 477.
- action of, on bromacetic acid, **12**, 1.
- action of, on bromanilic acid, **23**, 13.
- action of, on carbon bisulphide, **24**, 773.
- action of, on chloraniline, **11**, 283.
- action of, on chloroform and on pentachlorethane, **25**, 232.
- action of, on codeine, **4**, 116.
- action of, on conine, **1**, 352.
- action of, on dry mercuric oxide, **15**, 483.
- action of heat on, **24**, 993.
- action of hyponitric acid on aqueous solutions of, **11**, 143.
- action of, on iodoform, **24**, 778.
- action of, on isoprene, **15**, 118.
- action of, on lead acetate, **22**, 185.
- action of light on, **25**, 28.
- action of, on meconic acid, **6**, 73.
- action of, on melaniline, **1**, 299.
- action of, on mesitylene, **2**, 108.
- action of, on papaverine, **8**, 284.
- action of, on peppermint-camphor, **15**, 29.
- action of, on phosphorous chloride, **25**, 385.
- action of, on potassium acetate, in aqueous solution, **22**, 186.
- action of, on pyromeconic acid, **6**, 81.
- action of, on sodium valerate, in aqueous solution, **22**, 187.
- action of, on solution of silver nitrate, **15**, 479.
- action of, on styrol, **11**, 345.

- Bromine, action of, on caoutchou and oil of turpentine, **15**, 117.
- action of, on vanadium tetrachloride, **23**, 349.
- Bromine in the Bonnington water, **11**, 209.
- detection of, in organic bodies, **25**, 1039.
- diffusion of, **4**, 86.
- estimation of, by Carius's method, **25**, 1039.
- latent heat of vapour of, **1**, 34.
- molecular combinations of phosphoric bromochloride with, **25**, 670.
- production of organic bases containing, **11**, 266.
- recovery of, from residues, **24**, 784.
- separation of, from iodine and chlorine, **10**, 234.
- solidifying point of, **25**, 220.
- solubility of, in water, **15**, 487.
- specific heat of, **1**, 27.
- symbol of, in Brodie's calculus of chemical operations, **21**, 418.
- use of, in chemical analysis, **24**, 951.
- use of, instead of chlorine, for analytical purposes, **24**, 581.
- volumetric estimation of, **8**, 224; **24**, 436.
- Bromine and chlorine, action of, on nitrosesidine, **2**, 120.
- Bromine and chlorine together, volumetric estimation of, **8**, 225.
- Bromine-compound, volatile, obtained in the technical preparation of bromine, **8**, 286.
- Bromine-compounds, specific heat of, **19**, 197, 225.
- Bromine-derivatives of coumarin, **23**, 368.
- Bromine-substitution-products of aniline, **19**, 61.
- Bromine-water, action of, on oxide of mercury, **15**, 481.
- — as a test for phenol and allied substances, **24**, 1216.
- Bromisatin, action of fused potassium hydrate on, **11**, 289.
- compounds of, **11**, 291.
- Bromobenzene-sulphonic acid, **25**, 245.
- Bromobenzoic acid, **18**, 307; **24**, 363, 826.
- — melting at 155°, formation of salicylic acid from, **25**, 403, 624.
- Bromobenzonitrile, **24**, 923.
- Bromocamphor, **18**, 93.
- Bromocamphoric anhydride, **24**, 548; **25**, 896.
- Bromochloride, phosphoric, **25**, 282.
- — action of, on chloral, **25**, 247.
- Bromochlorobenzoic acid, **25**, 144.
- Bromochlorosalicylic acid, **25**, 144.
- Bromochrysene, **24**, 693.
- Bromocodaine, **4**, 116.
- Bromocodide, **24**, 404.
- Bromocomenic acid, **4**, 369.
- Bromocoumarilic acid, **24**, 48.
- Bromocoumarin, **23**, 371.
- Bromocoumarins, α and β , **24**, 37, 41, 54.
- Bromocresol, **24**, 565.
- Bromodichloride of phosphoryl, solidification of, **23**, 1162.
- Bromodiethylin, **24**, 908.
- Bromodimethyl-protocatechuic acid, **24**, 830.
- Bromodioxybenzoic acid, **25**, 1015.
- Bromoform, production of, in the technical preparation of bromine, **8**, 287.
- formation of carbon tetrabromide from, **23**, 163.
- Bromoglycollate of silver, its resolution into silver bromide and glyoxylic, **21**, 204.
- Bromoglycollic acid, **21**, 203.
- Bromoglycollide, **21**, 203.
- Bromonaphthalic acid, **24**, 374.
- Bromomeconic acid, **4**, 369.
- Bromomolybdous compounds, **25**, 1080.
- Bromonitramidobenzene, phenylenediamine from, **25**, 1003.
- Bromonitrobenzene, **24**, 687.
- formation of, from perbromide of α -diazonitrobenzene, **20**, 83.
- action of potassium cyanide on, **24**, 220.
- Bromonitrophenolsulphonic acids, **25**, 864.
- Bromophenetolsulphonic acid, **24**, 1040.
- Bromophenoldisulphonic acid, its behaviour towards nitric acid and bromine, **25**, 865.
- Bromophthalic acid, **25**, 76.
- Bromopianyl, **9**, 276.
- Bromopicroin, formation of carbon tetrabromide from, **23**, 162.
- decomposition of, under the influence of heat, **24**, 775.
- preparation and properties of, **23**, 153.
- Bromopropionic acid, formation of, by the action of hydrobromic acid on lactic acid, **17**, 205.
- Bromopropylene, identity of the hydrobromide and hydriodide of, with the dihydrobromide and hydrobromiodide of allylene, **25**, 683.
- Bromopyrmeconic acid, **6**, 81.
- Bromoreins, **25**, 297.
- Bromosalicylic acid, **25**, 894.
- Bromostyrol, **11**, 345.

- Bromosuccinic acid, formation of, by the action of hydrobromic acid on malic acid, **17**, 205.
- Bromosulphobenzoic acid and its derivatives, **24**, 369.
- Bromo-*a*-sulphothymolic acid, **24**, 1054.
- a*-Bromosulphotoluene, **25**, 1005.
- Bromosulphotoluenes, **24**, 1056.
- Bromotetracodeine, **24**, 404, 932.
- Bromotetramorphine, **24**, 932.
- Bromothymoquinones, **24**, 351.
- Bromotoluene, action of sodium on, **24**, 510, 1029.
- liquid, **25**, 1094.
- liquid, orthoxylenes from, **25**, 893.
- (ortho), sulpho-acids obtained from, **24**, 129.
- Bromotoluenes, **25**, 696.
- Bromotoluidines, decompositions of isomerie, **24**, 713.
- Bromotolylene, preparation of toluylene alcohol from, **25**, 137.
- Bromotolylacetamide, **24**, 564.
- Bronze, action of hydrochloric acid on, **19**, 452.
- action of nitric acid on, **19**, 450.
- action of sulphuric acid on, **19**, 453.
- change in a buried, **25**, 882.
- Bronzes found in Great Britain, analyses of, **18**, 215.
- Brucine, action of nitric acid on, **1**, 192; **7**, 273.
- as a test for nitric acid, **24**, 581.
- oxidation of, **21**, 164.
- Brucine phosphate with two equivalents of brucine, **1**, 57.
- Brucine tri-iodide, **24**, 399.
- Bryonicin, correction of a note on, **25**, 134.
- Buckwheat, growth of, in solutions of potassium salts, **25**, 165.
- Buckwheat grain, composition of, **25**, 840.
- Building-rubbish, organic matter in, **25**, 271.
- Bulb-dialyser, **15**, 239.
- Bunsen's battery, modifications which may give rise to variations in the energy of, **25**, 664.
- proposed modification of, **25**, 664.
- Burettes, movable holders for, **24**, 441.
- Burlington House, negotiations respecting the occupation of, by the Royal, Linnean, and Chemical Societies, **10**, 180.
- removal of the Chemical Society to, **11**, 181.
- Burnt clay as a fertiliser, **24**, 279.
- Burnt iron, **25**, 561.
- Burnt iron and burnt steel, **24**, 790.
- Butter, colouring of, with carrot pigment, **24**, 968.
- Butyl, **8**, 266.
- atomic weight of, **22**, 169.
- Butyl acetate, **22**, 160, 168.
- normal, **24**, 521.
- Butyl alcohol, **8**, 264.
- Butyl alcohol of fermentation, **22**, 161, 169; **25**, 888.
- acids produced by oxidation of, **24**, 125.
- Butyl alcohol, normal, **24**, 516.
- conversion of, into butylene hydrate, **25**, 474.
- formation of, from butyryl chloride, **24**, 229.
- synthesis of, **25**, 396.
- Butyl alcohols, boiling points of, **24**, 523.
- Butyl bromide, **22**, 156, 167; **24**, 524.
- Butyl butyrate, preparation of, by oxidation of butyl alcohol, **24**, 902.
- Butyl chloride, **24**, 809.
- Butyl compounds derived from the butyl alcohol of fermentation, **22**, 153.
- Butyl derivatives, normal, **25**, 396.
- Butyl ethers, **8**, 266-271.
- Butyl hydride in American petroleum, **18**, 60.
- Butyl iodide, **22**, 155, 166; **24**, 520.
- action of mercuric cyanide and of zinc ethyl on, **25**, 1092.
- normal, behaviour of, with alcoholic potash, **24**, 524.
- and water, simultaneous distillation of, **25**, 239.
- Butyl mercaptan and butyl urethane, **8**, 276.
- Butyl (mercury-), **22**, 162, 168.
- Butyl nitrate, **22**, 158, 168, 169.
- Butyl nitrite, **22**, 159.
- action of sulphurous acid on, **23**, 417.
- Butyl peroxide, **17**, 275.
- Butyl urethane, **8**, 276.
- Butylacetic acid, formation of, by the action of nascent hydrogen on succinic acid, **16**, 304.
- Butylamine, **8**, 272; **24**, 522.
- Butylamine bromide, normal, **24**, 520, 523.
- Butylamine butyrate, normal, **24**, 522.
- Butylamine chloride, normal, **24**, 519.
- Butylamine cyanide, normal, **24**, 522.
- Butylamines, **24**, 121.
- Butylene, **24**, 520.
- action of hydriodic acid on, **24**, 525.
- formation of, by the action of zinc ethyl on monobromethylene, **20**, 28.
- Butylene-diamine, formation of, by the action of hydrogen on ethylene cyanide, **17**, 363.

Butylene-glycol, a condensation-product of aldehyde, **25**, 397.

Butyl-ethyl ether, normal, **24**, 520.

Butyrate of allyl, **10**, 322.

Butyrate of ethyl, capillary transpiration of, **15**, 439.

Butyrate of menthyl, **15**, 27.

Butyrate and acetate of calcium, distillation-products of a mixture of, **24**, 385.

Butyric acid, **1**, 361; **24**, 359.

— absorption of its vapour by charcoal, **20**, 162.

— capillary transpiration of, **15**, 434.

— compounds of glycerin with, **6**, 285.

— formation of, by the action of nitric acid on oleic acid, **111**, 239.

— formation of, by oxidation of β -hexyl alcohol, **16**, 307.

— formation of succinic acid by oxidation of, **3**, 186.

— a product of the oxidation of Chinese wax by nitric acid, **10**, 178.

— synthesis of normal, **25**, 402.

— transformations of, **15**, 141.

Butyric aldehyde, conversion of, into butyl alcohol, **24**, 517.

— preparation of, **24**, 516.

Butyric chloride, conversion of, into normal butyl alcohol, **24**, 229.

Butyric coumaric acid, **21**, 475.

Butyric coumarin, **21**, 56.

— formation of, from hydride of butyrosalicyl, **21**, 474.

Butyric ether, absorption of its vapour by charcoal, **20**, 162.

Butyridin, **6**, 286.

Butyrins, **6**, 285.

Butyrene, **25**, 892.

— derivatives of, **25**, 410.

Butyrosalicyl hydride, **21**, 472.

Butyryl-urea, **8**, 160.

C.

Cabbage, ash-analysis of, **24**, 1208.

Cables, gutta-percha, experiments upon damaged, suspended in air or placed under ground, **18**, 279.

Cables, submarine, experiments on, **18**, 278.

Cacodyl, **13**, 214.

— decomposition of, **1**, 55.

— isolation of, **1**, 49.

Cacodyl compounds, formation of, from the radical, **1**, 54.

— containing platinum, **1**, 63.

Cacoplatyl compounds, **1**, 64, 69.

Cacotheline, **1**, 273.

Cactus, composition of the ashes of the, **3**, 57.

Cadmium, action of, on mercuric ethide, **17**, 36.

— heat of combustion of, **24**, 793.

— modifications of the reactions of, by citric acid, **10**, 116.

— organo-metallic compound of, **13**, 199.

— passivity of, **25**, 41.

— reflecting power of, for chemical rays, **17**, 77.

— solubility of, **11**, 19.

— specific gravity and atomic volume of, **111**, 60.

— symbol of, in Brodie's chemical calculus, **21**, 448.

Cadmium ammonio-chloride, **8**, 252.

Cadmium chloride, action of, on mercuric ethyl, **16**, 21.

Cadmium iodide, compound of, with aniline, **25**, 249.

Cadmium nitrate, **8**, 251.

Cadmium oxide, **111**, 82.

— influence exerted by the crystallisation of, on its heat of combination, **24**, 870.

Cadmium phosphite, **20**, 371.

Cadmium pyrophosphotriamate, **19**, 9.

Cadmium salts, **1**, 104; **8**, 251.

— osmose of, **8**, 89.

Cadmium selenites, **2**, 65.

Cadmium sulphate, **8**, 251-2.

Cadmium sulphide, **111**, 89.

— as a yellow colouring for soap, **24**, 868.

Cadmium sulphites, **111**, 295.

Cadmium thiophosphamate, **18**, 6.

Cadmium thiophosphodiamate, **18**, 4.

Cadmium and ammonium chloride, **8**, 253.

Cadmium and ammonium sulphate, **8**, 255.

Cadmium and barium chloride, **8**, 254.

Cadmium and copper, reciprocal precipitation of, **9**, 292.

— separation of, **13**, 78.

Cadmium and iron, reciprocal precipitation of, **9**, 293.

Cadmium and lead, reciprocal precipitation of, **9**, 293.

Cadmium and potassium bromide, **8**, 255.

Cadmium and potassium chloride, **8**, 253.

Cadmium and potassium sulphate, **8**, 256.

Cadmium and sodium chloride, **8**, 254.

Cadmium and sodium sulphate, **8**, 257.

Cadmium and thallium, simultaneous occurrence of, **17**, 141.

- Cadmium and tin, reciprocal precipitation of, **9**, 293.
 Cadmium-ethyl, **9**, 193.
 Cæsium, quantity of, in the hot spring of Wheal Clifford, **25**, 273.
 Cæsium salts, preparation of, from lepidolite, **25**, 880.
 Caff ammonium, iodochloride of, **19**, 147.
 Caffidine, decomposition of, by barium hydrate, **24**, 146.
 Caffeine, **3**, 87.
 — amount of, in coffee, and its physiological action, **25**, 897.
 — amount of, in raw coffee, **9**, 51.
 — composition of, III, 321.
 — compound of, with terchloride of gold, III, 327.
 — compound of, with chloride of mercury, III, 326.
 — compound of, with bichloride of platinum, III, 324.
 — compound of, with silver nitrate, III, 325.
 Caffeine periodide, **18**, 100.
 Cajuput oil, **17**, 7; **25**, 8.
 — constitution of, **1**, 63.
 — occurrence of copper in, **25**, 529.
 Cajputene, **14**, 64.
 Cajputene bromide, **14**, 68.
 Cajputene chloride, **14**, 67.
 Cajputene hydrates, **14**, 65.
 Cajputene hydriodate, **14**, 69.
 Cajputene hydrochlorates, **14**, 68.
 Calabar bean, preparation of neutral eserine sulphate from, **25**, 82.
 Calamene, **25**, 3.
 Calamine, siliceous, from Scharley in Upper Silesia, **24**, 1178.
Calamus aromaticus, oil of, II, 122; **17**, 7.
 Calcareous substances, such as are found in the organism, artificial production of, **24**, 950.
 Calcination, alleged influence of, on the heat of solution of metallic oxides, **25**, 217.
 Calcio-magnesio-ferrous augite (sahlite), occurrence of, in the Pennine Alps, **25**, 291.
 Calcium, preparation of, by electrolysis, **8**, 28.
 — spectrum of, **24**, 1149.
 Calcium acetoxybenzamate, **13**, 241.
 — amidobenzoate, **9**, 270.
 — benzoglycollate, **5**, 77.
 — bicomenate, **4**, 365.
 — biniodacetate, **13**, 2.
 — borate from Tampaca, Peru, **25**, 794.
 — bromacetate, **11**, 23.
 Calcium carbonate, solubility of, in carbonic acid water, **25**, 788.
 — — hydrated, **24**, 801.
 — — rhombohedral modifications of, III, 513.
 Calcium chloride, diffusion of, **4**, 93.
 — — osmose of, **8**, 73.
 — — precipitation of solutions of ammonium carbonate, sodium carbonate, and ammonium carbamate by, **23**, 359.
 — — composition of the precipitate formed by adding a solution of ammonio-sodic phosphate to solution of, **25**, 673.
 Calcium chrysammate, **19**, 321.
 — citrate, decomposition of, in contact with putrefying curd, **5**, 1.
 — cobaltcyanides, **24**, 390.
 — comenate, neutral, **4**, 366.
 — coumarilate, **24**, 47.
 — diazo-amidobenzoate, **18**, 301.
 — dinitroethylate, **11**, 87.
 — glyoxalate, compound of, with calcium bisulphite, **18**, 194.
 — — compound of, with calcium lactate, **18**, 195.
 Calcium hydrate, action of bromine on, **15**, 478.
 — — osmose of, **8**, 86.
 Calcium hydropiperate, **15**, 22.
 — hydrosulphate, compound of, with oil of mustard, **8**, 187.
 — insolinate, **9**, 213.
 — iodate in sea-water, **25**, 597.
 — malates, I, 29.
 — metaphosphate, III, 279.
 — methylodithionate, **10**, 248.
 — nitrate, diffusion of, **4**, 91.
 — — osmose of, **8**, 85.
 Calcium nitrotolylate, III, 434.
 — peroxide, preparation of, **25**, 880.
 — phosphate, influence of the addition of, to the food, on the composition of the ash of milk, **25**, 837.
 — — occurrence of considerable deposits of crystallised, in teak-wood, **15**, 91.
 — — occurrence of deposits of crystallised, in human urine, **15**, 8.
 — — separation of, from magnesium phosphate, II, 142.
 — — solubility of some forms of, **25**, 269.
 — — solubility of tricalcic phosphate, **19**, 296.
 — — hydrated, II, 222.
 Calcium phosphite, **20**, 362.
 — pyromecconate, **6**, 79.
 — pyrovanadate, **24**, 32.
 — selenites, **2**, 60.

- Calcium selenocyanide, **4**, **19**.
 — sorbate, **12**, **48**.
 — succate, dialysis of, **15**, **254**.
 — sulphate, solubility of, in aqueous sodium hyposulphite, **16**, **29**.
 — sulphide, estimation of, in bone char, **25**, **264**.
 — sulphite, use of, in breweries, **25**, **1130**.
 — tartrate, quantity of crystallisation-water in, **25**, **375**.
 — toluylate, **III**, **431**.
 — valerate, normal, **24**, **1045**.
 — vanadates, **24**, **32**.
 Calcium-ammonium arsenate, **11**, **10**.
 — glyoxylate, **18**, **196**.
 Calcium-potassium sulphate (potassogypsite), **3**, **348**.
 Calespar, **24**, **506**.
 Calespar and arragonite, heat disengaged in decomposition of, **6**, **239**.
 Calespar and sodium nitrate, isomorphism of, **24**, **197**.
 Calculi, urinary, **24**, **848**.
 Calculus, intestinal, from a horse, **24**, **425**.
 Calculus of chemical operations, **21**, **367**.
 Caldeira de Furnas, San Miguel, Azores, absence of combustible gases in the emanations from, **25**, **885**.
 Calico-printing with coal-tar colours, **14**, **252**.
 California, analysis of gold-dust from the coast of, **2**, **193**.
 Calomel, formation of corrosive sublimate in mixtures containing, **25**, **850**.
 Caloric. See Heat.
 Calorific equivalents, **6**, **254**, **255**.
 Calorimeter for determining the amount of heat evolved in the combustion of various substances with potassium chlorate, **21**, **34**.
 Calorimeter used by H. Kopp for determining the specific heats of solid bodies, **19**, **172**.
 Calorimetric researches, Bunsen's, **24**, **180**.
 Camphic acid, **25**, **496**, **821**.
 Campholic acid, **25**, **496**.
 Camphor, absorption of its vapour by charcoal, **21**, **189**.
 — artificial formation of, **25**, **1010**.
 — bromine-derivative of, **18**, **92**.
 Camphor of peppermint, **15**, **24**.
 Camphor-acids, **25**, **1098**.
 Camphor-group, compounds of the, **25**, **496**, **1010**.
 — — researches on compounds belonging to the, **24**, **560**, **1048**.
 Camphoric acid, **24**, **817**; **25**, **895**, **1098**.
 — — derivatives of, **24**, **548**.
 Camphoric acid, basicity of, **25**, **146**.
 — — reaction of, with hydriodic acid, **24**, **549**.
 — — inactive, formation of, from mesocamphoric acid, **25**, **147**.
 Camphorin, **6**, **286**.
 Camphoric acid, **24**, **1049**; **25**, **1098**.
 Camphoryl peroxide, **17**, **277**.
 Camphrene, **25**, **1012**.
 Campi Flegrei, composition of gases evolved in the (June, 1869), **25**, **884**.
 Canadian oil, value of, as a solvent for extraction of oil seeds, **24**, **969**.
 Canals (irrigation), nitrous acid in the water and mud of, **24**, **950**.
 Canaúba wax, chemical constitution of, **22**, **87**.
 Candles, influence of atmospheric pressure on the rate of combustion of, **15**, **170**.
 Cane-sugar, action of aniline on, **25**, **150**.
 — — contraction of solutions of, at the moment of inversion, **25**, **463**.
 — — conversion of, into a substance isomeric with cellulose and inulin, **II**, **384**.
 — — estimation of, by circular polarisation, **13**, **266**.
 — — reaction of, with acetic anhydride, **25**, **69**.
 — — saline compounds of, **24**, **269**.
 — — transformation of, into glucose by the action of light, **25**, **65**.
 — — volume occupied by, **II**, **418**.
 Camel coal. See Coal.
 Caoutchin, action of sulphuric acid on, **15**, **122**.
 — composition of, **15**, **116**.
 — conversion of, into cymene and paracymene, **15**, **119**.
 Caoutchin and isoprene, **15**, **110**.
 — — table of physical properties of, **15**, **123**.
 — — polymeric relations of, **15**, **117**.
 Caoutchin and oil of turpentine, comparative experiments on the action of bromine on, **15**, **117**.
 Caoutchouc, action of a septum of, on gases, **20**, **235**.
 — composition of, **15**, **122**.
 — decay of, **18**, **280**.
 — elasticity of, **24**, **798**.
 — dyeing of, with aniline colours, **24**, **971**.
 — p-penetration of, by different gases in equal times, **20**, **240**.
 — penetration of, by equal volumes of gas, **20**, **239**.
 — penetration of skin balloons of, by gases, **20**, **251**.

- Caoutchouc, relations between the first and second hydrocarbons produced by the distillation of, **15**, 116.
 — tenacity of various sorts of, **24**, 970.
 Caoutchouc of Borneo, sweet volatile principle found in, **24**, 915.
 Caoutchouc, sheet, penetration of, by gases, **20**, 250.
 Caoutchouc-tubing, vulcanised, penetration of, by gases, **20**, 248.
 Caoutchouc, vulcanised, **24**, 970.
 — action of ozone on, **25**, 1072.
 — between double cotton-cloth, penetration of, by gases, **20**, 248.
 Capillary action and density in saline solutions, relation between, **25**, 212.
 Capillary attraction, phenomena of, observed with chloroform, bisulphide of carbon, and other liquids, **1**, 174.
 Capillary pyrites, **24**, 1176.
 Capramide, **4**, 374.
 Caprate of barium, **4**, 374.
 Caprate of silver, **4**, 374.
 Caprates of calcium and magnesium, **4**, 374.
 Caprylic acid, derivatives of, **24**, 359.
 — new source of, with remarks on some of its salts, **4**, 372.
 — occurrence of, in some fusel oils, **5**, 22.
 Capric ether, **4**, 374.
 Caproate of amyl, **3**, 213.
 Caproate of barium, action of heat on, **3**, 215.
 Caproic acid, formation of, in the acid fermentation of wheat-bran, **24**, 545.
 — contributions towards the history of, **3**, 210.
 — decomposition of, under the influence of the galvanic current, **3**, 222.
 — normal, **24**, 1034.
 — synthesis of, **21**, 31.
 Caprone, **24**, 360; **25**, 892.
 — action of nitric acid on, **3**, 220.
 — composition of, **3**, 217.
 — preparation of, **3**, 215.
 Caproyl, composition of, **3**, 226.
 Caproyl hydride from cannel coal, **15**, 422.
 Capryl acetate, **7**, 288.
 — bromide, **18**, 293.
 — chloride, **7**, 288.
 — hydride from cannel coal, **15**, 425.
 — iodide, **7**, 288.
 — from Boghead naphtha, **15**, 361.
 Caprylamine, **7**, 108.
 — platinum-salt of, **15**, 361.
 Caprylanilide, **6**, 186.
 Caprylene, **7**, 287.
 Caprylic acid, a product of the oxidation of Chinese wax by nitric acid, **10**, 178.
 — occurrence of, in some fusel oils, **5**, 22.
 Caprylic and cœnanthyllic alcohols, **18**, 290.
 Caprylic alcohol, production of, **4**, 362.
 Caprylic alcohol and its derivatives, **7**, 286.
 Caprylic aldehyde, **8**, 155; **9**, 189.
 Caramel, diffusion of, **15**, 224.
 — dialysis of, **15**, 258.
 Caraway, oil of, **17**, 8.
 Carballylic acid, **18**, 334.
 Carbamate of ammonium: its direct conversion into urea, **21**, 194.
 — dissociation-tension of, **24**, 1195.
 — distinction of, from carbonates, **23**, 228.
 — a product of the condensation of mixtures of carbonic anhydride, ammonia, and water, **23**, 273.
 — precipitation of, by calcium chloride, **23**, 359.
 Carbamate, benzylic, **24**, 927.
 Carbamide-carbanilide, **2**, 37.
 Carbamide-nitrocarbanilide, **2**, 42.
 Carbanil, action of heat on, **2**, 313.
 Carbanilic ether, **21**, 192.
 Carbanilide, **2**, 43.
 Carbazol, **25**, 302.
 — synthesis of, **25**, 627.
 Carbazotic acid, action of chloride of iodine on, **17**, 332.
 Carbides of hydrogen, their behaviour with magnesium, **20**, 130.
 Carbinol, isopropylic, **22**, 164.
 Carbinols, **19**, 51.
 Carbohydrates, acetyl-derivatives of, **25**, 66.
 — anilides of, **25**, 149.
 — formation of pyrocatechin from, **24**, 226, 849.
 Carbohydrochinomic acid, **16**, 353.
 Carbohic acid, absorption of its vapour by charcoal, **20**, 162.
 — crystallisation of, **22**, 149.
 — and hydrogen peroxide, reducing action of, **21**, 356.
 — testing of crude, **25**, 266.
 — see also Phenol.
 Carbon in the air of towns, **11**, 230.
 — atomic weight of, **1**, 9; **11**, 129.
 — combination of, with iron in the blast-furnace, **22**, 217.
 — combustion of, by oxygen, **25**, 383.
 — condition of, in iron and steel, **24**, 106.
 — of the Cranbourne meteorite, **24**, 1023.

Carbon from decomposition of carbonic oxide by iron, **24**, 1023.

- determination of, in gun-cotton, **20**, 333.
- determination of combined, in meteoric iron, **25**, 604.
- determination of, in steel, **23**, 375.
- determination of organic, in potable waters, **21**, 87.
- determination of the "total" in cast-iron, **22**, 182.
- effect of excess of, in the composition of a substance, or its propagation of light, **23**, 151.
- Elliott's method of estimating, in bone-charcoal, graphite, anthracite, &c., **25**, 1120.
- fixed by plants, origin of, **25**, 158.
- in the Greenland meteorites, **25**, 994.
- heat disengaged in combustion of, **6**, 235.
- in iron and steel, application of the Sprengel mercurial pump to the estimation of, **25**, 924.
- oxidation of, by chromic anhydride, **25**, 143.
- photographic pictures, development of, by means of potassium permanganate, **25**, 338.
- preparation of pure, **20**, 134.
- proportion of, in various kinds of steel, **21**, 281.
- specific gravity and atomic volume of, **11**, 93.
- specific heat of, **19**, 189; **25**, 592.
- spectra of, **24**, 97, 1147.
- spectrum of, **16**, 97.
- on the surface of buildings, &c., in large towns, **11**, 233.
- symbol of, in Brodie's chemical calculus, **21**, 425.

Carbon, graphite, or "kish," **22**, 221.

Carbon and hydrogen, direct combination of, **17**, 37.

Carbon, boron, and silicon, atomic weights of, **14**, 153.

Carbon bisulphide, absorption of its vapour by charcoal, **21**, 189, 192.

- action of, on amidobenzoic acid, **24**, 238.
- action of, upon amylamine, **13**, 60.
- action of, on aniline, **2**, 48.
- action of bromine on, **24**, 773.
- action of, on various salts, **18**, 26.
- applications of, **24**, 1223.
- behaviour of triethylphosphine with, **13**, 304.

Carbon bisulphide in coal-gas, **13**, 84.

- composition of the deposit from retorts in which it has been made, **25**, 674.
- detection of, **24**, 1090.
- diffusion-velocity of the vapour of, **16**, 400.
- effect of, on the inflammability of the constituents of coal-gas, **16**, 401.
- formation of acetic anhydride by the action of, on acetates, **18**, 22.
- formation of carbon tetrabromide from, **23**, 161.
- formation of phenyl acetate by the action of, on a mixture of lead acetate and phenyl alcohol, **18**, 24.
- hydrate of, **24**, 196, 307, 488.
- igniting point of, **16**, 399.
- latent heat of vapour of, **1**, 35.
- phenomena of capillary attraction observed with, **1**, 174.
- preparation and purification of, **24**, 799.
- reactions of, with the hydrates of the alkaline earths, **24**, 1023.
- solubility of, in alcohol, **24**, 800.
- solubility of, in water, **24**, 1023.

Carbon bromide, **14**, 205.

Carbon chloride, derivatives of, **24**, 900.

- Jolin's, **20**, 443; **25**, 996.

Carbon chlorobromides, two, **25**, 232.

Carbon-compounds, refraction-equivalents of, **23**, 107.

Carbon dioxide, absorption of, by charcoal, **18**, 290.

- absorption of, by charcoal under pressure, **24**, 78.
- action of electric discharge on, **13**, 361.
- action of, on potassium tetroxide, **14**, 385.
- action of, on sodium dioxide, **14**, 284.
- amount of, contained in sea-air, **20**, 189.
- amount of, in the atmosphere of tropical Brazil during the rainy season, **20**, 199.
- apparatus for general fractional distillation in, **13**, 121.
- change of volume and liquefaction of, produced by pressure, **23**, 80.
- combinations of, with ammonia and water, **23**, 171.
- daily observations at Rostock,

- on the amount of, in the atmosphere, **25**, 668.
- Carbon dioxide, decomposition of, under the influence of the electric discharge, **25**, 667.
- — — decomposition of, within growing cells and intercellular passages in sunshine, **16**, 150.
- — — doubling of the volume of, during its conversion into the monoxide, **24**, 304.
- — — estimation of, by absorption in potash, **10**, 258.
- — — exhalation of, from the human body, **1**, 50 (p).
- — — formation of, by oxidation of amylie alcohol, **19**, 333.
- — — formation of, by oxidation of ethylene, **19**, 491.
- — — formation of, by oxidation of β -hexylene, **19**, 492.
- — — formation of, by oxidation of isopropylie iodide, **19**, 487.
- — — formation of, by oxidation of methylie acetate, **19**, 485.
- — — formation of, within vegetable cells in the dark, **16**, 151.
- — — heat evolved on adding ammonia to solution of, **24**, 1130.
- — — influence of spectrum colours on the decomposition of, by plants, **25**, 1107.
- — — passage of, through a septum of caoutchouc, **20**, 238.
- — — passage of, through heated platinum, **20**, 261.
- — — physical characters of, **24**, 884.
- — — preparation of propionic acid, by the action of, on an ethyl-compound, **11**, 103.
- — — properties of liquid, **15**, 163.
- — — quantity of, in the air of Manchester and its neighbourhood, arising from the combustion of coals, **11**, 199.
- — — quantity of, produced by respiration of animals, **10**, 252.
- — — solution of, in water, **23**, 37.
- — — simplified method of estimating, in the saturating gas of sugar-factories, **25**, 266.
- — — table showing the results of determinations of, in various localities, **10**, 268.
- — — table showing the distribution of, in dwelling rooms, &c., **10**, 269.
- — — volumetric estimation of atmospheric, **10**, 292.
- Carbon dioxide and carbon monoxide, electric spectra of metals in, **17**, 85.
- Carbon dioxide, ammonia, and water, the single or chemical substances produced by condensing mixtures of, **23**, 273.
- Carbon dioxide and hydrogen sulphide, analysis of mixtures of, **25**, 918.
- Carbon dioxide, hydrogen, and hydrogen sulphide, analysis of mixtures of, **25**, 919.
- Carbon dioxide and sulphur dioxide, analysis of mixtures of, **25**, 919.
- Carbon dioxide and sulphur dioxide, absorption of, in water, **17**, 98.
- Carbon dioxide and water, formation of organic substances from, **17**, 40.
- Carbon disulphide. See Carbon bisulphide.
- Carbon monoxide, reaction of, in the blast-furnace, **22**, 211.
- — — action of, on blood, **24**, 839.
- — — action of chromic acid on, **25**, 590.
- — — action of electric discharge on, **13**, 362.
- — — action of, on sodium dioxide, **14**, 283.
- — — combination of, with potassium, **12**, 269.
- — — compound of, with hæmoglobin, **25**, 899.
- — — decomposition of, by the combined action of metallic iron and its oxides, **24**, 738.
- — — decrease in chemical activity of, in the reduction of ferroso-ferric oxide, by admixture with foreign gases, **25**, 281.
- — — diffusion-velocity of, **16**, 400.
- — — effect of heating of lead sulphate and sulphide in, **16**, 42, 46.
- — — formation of formic acid from, **9**, 182.
- — — igniting point of, **16**, 399.
- Carbon monoxide and hydrogen, analysis of mixtures of, **25**, 919.
- Carbon monoxide and marsh-gas, formation of propylene from, **17**, 45.
- Carbon oxides, behaviour of, with magnesium, **20**, 129.
- Carbon oxysulphide, **25**, 995.
- Carbon perchloride, absorption of its vapour by charcoal, **20**, 164; **21**, 192.
- Carbon protosulphide, Baudrimont's, **13**, 248.
- Carbon sulphobromide, **24**, 781.
- Carbon sulphochloride, **24**, 344.
- Carbon tetrabromide, **23**, 154, 161; **24**, 773.
- — — action of alcohol on, **24**, 784.
- — — action of ammonia on, **24**, 782.
- — — action of aniline on, **24**, 782.

- Carbon, tetrabromide, action of anti-
mony on, **24**, 784.
- — — action of reducing agents on,
23, 165.
- — — action of, on silver oxalate,
24, 782.
- — — boiling point and specific
gravity of, **24**, 780.
- — — formation of, in the manu-
facture of bromal, **24**, 559.
- — — from bromoform, **23**, 163.
- — — from bromopierin, **23**, 162.
- — — from carbon disulphide, **23**,
161.
- Carbon tetrachloride, action of, on phos-
phorus pentoxide, **25**, 605.
- — — action of phosphorus penta-
sulphide on, **25**, 452.
- Carbon trichloride, action of potassium
sulphite on bodies containing, **25**, 388.
- Carbonaceous compounds of vegetable
matter, reducing power of certain, **16**,
152.
- Carbonate of ammonia, commercial, **23**,
231.
- — — commercial, products of the
slow distillation of, **23**, 266.
- — — commercial acid, **23**, 240.
- — — formerly found in commerce,
not a single substance, **23**, 271,
278.
- Carbonate, ammonio-magnesian, pro-
ducts of the distillation of, **23**, 272.
- Carbonate of ammonium, absorption of,
by alumina, **21**, 12.
- — — absorption of, by ferric oxide,
21, 11.
- — — action of, on magnesia salts,
15, 196.
- — — precipitation of, by calcium
chloride, **23**, 359.
- — — time required for the disso-
ciation and reproduction of, **25**, 79.
- Carbonate of ammonium, acid, **23**, 198.
- — — acid, produced by condensing
mixtures of carbonic anhydride, am-
monia, and water, **23**, 274.
- — — half acid, **23**, 189.
- — — normal, **23**, 172.
- Carbonate of amyl, preparation of, **5**,
131.
- Carbonate of calcium, certain causes of
difference in the crystals of, **24**, 670.
- — — hydrated, **24**, 801.
- Carbonate of didymium, **6**, 267.
- — — of ethyl, tetrabasic, **17**, 198.
- — — of ethylene-hexethyl-diphospho-
nium, **14**, 99.
- — — of iron, spathic, **11**, 105.
- — — of lead, native, analysis of a speci-
men of, from Teesdale, Durham, **4**,
175.
- Carbonate of magnesium and ammonium,
15, 199.
- Carbonate of methyl-plumbethyl, **7**, 269.
- Carbonate of potassium, absorption of,
by alumina, **21**, 10.
- — — absorption of, by ferric oxide,
21, 6.
- — — products of the distillation of
sal-ammoniac with, **23**, 259.
- Carbonate of sodium, action of, on dicar-
bonate of copper, **14**, 71.
- — — precipitation of, by calcium
chloride, **23**, 359.
- — — products of the distillation of
sal-ammoniac with, **23**, 260.
- Carbonate of stibtriethyl, **9**, 280.
- — — of thallium, **17**, 133.
- Carbonate and silicate of soda, action of,
on cotton fibre, **18**, 70.
- Carbonates, atomic volumes of, **11**,
453.
- — — their behaviour with magnesium,
20, 128.
- Carbonates, alkaline, volumes occupied
by, **11**, 454.
- Carbonates, alkaline and earthy, analysis
of ashes rich in, **11**, 186.
- — — action of boracic acid on the,
12, 177.
- Carbonates of aluminium, iron, and
chromium, **13**, 90.
- Carbonates of ammonium, distillation
of the normal, acid, and half-acid,
23, 261.
- — — constitution of, **23**, 209.
- — — examined by Rose, not single
substances, **23**, 279.
- Carbonates of copper, basic, **14**, 48,
70.
- Carbonates of lead constituting the
white lead of commerce, properties
and composition of the, **4**, 165.
- Carbonates of potassium and sodium,
action of arsenious acid on, at 212° F.,
15, 281.
- Carbonates of potassium and sodium,
action of arsenious acid on, at a low
red heat, **15**, 287.
- Carbonates of potassium and sodium,
action of bromine on solutions of the,
15, 477.
- Carbonates and nitrates, action of boracic
acid upon, **12**, 165.
- Carbonic acid in carbonated alkalis, &c.,
apparatus for estimating, **11**, 199.
- Carbonic acid, basicity of, **22**, 69.
- — — effect of, on a solution of lead
chloride, **23**, 38.
- — — estimation of, in iron ores,
15, 337.
- — — estimation of, by means of
manganate of potash, **11**, 213.

- Carbonic acid, estimation of, in sea-water, **25**, 455.
 ——— estimation of, in well-water, **24**, 582.
 ——— estimation of combined, in water, **25**, 524.
 ——— influence of marl on the formation of, in soil, **24**, 751.
 ——— reduction of, to oxalic acid, **21**, 121.
 ——— in vegetable ash, **11**, 190.
 Carbonic and silicic acids, state of combination of, in water, **25**, 525.
 Carbonic acid gas. See Carbon dioxide.
 Carbonic acid water, solubility of calcium carbonate in, **25**, 788.
 ——— water, solubility of bone-ash phosphates in, **24**, 80.
 Carbonic anhydride. See Carbon dioxide.
 Carbonic and alcoholic fermentation of sodium acetate and ammonium oxalate, **24**, 511.
 Carbonic ether, formation of, **22**, 441.
 Carbonic oxide. See Carbon monoxide.
 Carbonyl chloroplatinite, **24**, 1011.
 Carbonyl cyanide, attempts to prepare, **24**, 900; **25**, 148.
 Carbonyl-diacetamide, **25**, 720.
 Carbonyl-diburet, **25**, 718.
 Carbonyl-urea, formation of, by the action of liquid phosgene on urea, **25**, 718.
 Carbothialdine, **1**, 81; **25**, 691.
 Carboxamidobenzoate, ethylic, **25**, 81.
 Carboxamidodraeylic acid, **25**, 711.
 Carmidine, **7**, 103.
 Carminaphtha, **14**, 247.
 Carmine, resinous body produced by heating, with water, **25**, 704.
 ——— spectroscopic characters of the ammoniacal solution of, **24**, 1096.
 Carmine acid, action of nitric acid on, **11**, 469.
 ——— investigation of the mother-liquor from which it is separated, **11**, 477.
 ——— purification of, **11**, 461.
 Carmine, a new base from extract of meat, **24**, 716.
 Carrot, analysis of, **2**, 17.
 Carthusian pink as fodder, **25**, 103.
 Carvol and its isomerides, **25**, 9.
 Casein, artificial digestion of, by pepsin, **24**, 731.
 ——— constitution of, **24**, 732.
 ——— decomposition of, by heating with glacial acetic acid, **24**, 733.
 ——— oxidation of, by peroxide of manganese and sulphuric acid, **1**, 83.
 ——— products of the action of chromic acid on, **1**, 87.
 Casein, as thickening for colour-printing, **25**, 188.
 Cassia and albumin, fundamental difference between the structure of, **24**, 837.
 Cashew nut, examination of, **1**, 212.
 Cassia, essential oil of, **17**, 8; **25**, 11.
 Cast iron, composition of a carbonaceous substance existing in grey, **14**, 199.
 ——— dry process for estimation of silicon in, **24**, 1212.
 ——— heat developed by friction of, **3**, 320.
 Cast-iron projectiles, lead-coated, voltaic action in, **16**, 235.
 Cast iron, white, composition of, **25**, 677.
 Cast steel, the regenerative furnace as applied to the manufacture of, **21**, 279.
 Castor oil, circular polarisation of, **24**, 388.
 ——— products of the action of nitric acid on, **1**, 5 (p).
 Castor-oil alcohols, **6**, 307; **18**, 290.
 Castor-oil plant, alkaloid contained in the seeds of the, **17**, 195.
 Catalytic bodies, transformations produced by, **11**, 348.
 Catalytic decompositions, **16**, 337.
 Catechu, analysis of, **11**, 47.
 ——— examination of, **1**, 141.
 Catechuic acid, **11**, 47.
 Catharism, or the influence of chemically-clean surfaces, **22**, 125.
 Cathartin, complex nature of, **25**, 152.
 Cauliflower, analysis of, **2**, 11.
 Cedar oil, hydrocarbon obtained from, **25**, 5.
 Cedar wood, oil of, **17**, 8.
 Cedrat, oil of, **17**, 8.
 Celery, analysis of, **2**, 6.
 Cellulose, **24**, 543; **25**, 1000.
 ——— adaptation of the solubility of, in ammoniacal copper solution, to the preparation of water-proof paper, &c., **25**, 1137.
 ——— composition and digestibility of the substance associated with, in the fibre of meadow hay, **24**, 576.
 ——— digestibility of, by pigs, **25**, 1036.
 ——— formation of pyrocatechin from, **24**, 226.
 ——— function of, in the structure and development of plants, **24**, 575.
 ——— reaction of, with acetic anhydride, **25**, 66.
 Cellulose, animal, **25**, 309.
 Cellulose and inulin, conversion of cane-sugar into a substance isomeric with, **11**, 384.
 Cellulose and lignin, comparative nutritive value of, **24**, 575.

- Cellulose-paper, **25**, 1048.
- Cement for broken glass and porcelain basins, **25**, 1045.
- the so-called Scott's, **25**, 92.
- for stopping the cavities of teeth, **3**, 367.
- vegetable, of great adhesive power, **24**, 971.
- Cemented work, colouring of, **24**, 451.
- Cement-stone, analysis of, found near Jena, **24**, 678.
- Cements, examination and composition of, **24**, 1097.
- Cements and mortars, origin of the hydraulic power of, **25**, 528.
- Cerain, **1**, 249.
- Cerain, pseudo-, **1**, 251.
- Cerealia, oxide of copper in, **11**, 183.
- Cerite metals, **24**, 494.
- Cerium, determination of, in tantalites and columbites, **25**, 194.
- chloride, electrolysis of, **24**, 496.
- oxides, **24**, 495.
- salts, **24**, 496.
- selenites, **2**, 68.
- Cerium and lanthanum, volumetric estimation of, **8**, 232.
- Cerium, lanthanum, and didymium, separation of, **2**, 140; **24**, 494.
- Cerium and yttrium metals, separation of, **25**, 194.
- Ceroso-ceric oxide as a test for strychnine, **25**, 845.
- Cerotic acid produced by oxidation of paraffin, **21**, 468.
- Cerous phosphate, hydrated, from Cornwall, **18**, 259.
- Ceroxylon Ardicola*, analysis of, **111**, **25**.
- Ceruleolactin, **24**, 1014.
- Cerussite, **24**, 668.
- Cesspools, disinfection of, **24**, 971.
- Cetacea, creatine a constituent of the flesh of, **3**, 229.
- Cetin, analysis of, **1**, 43.
- constitution of, **5**, 84.
- Chalcedony, remarkable concretions of, from Brazil, **24**, 337.
- Chalcophyllite, **23**, 168.
- Chalk, analysis of the, from the Brighton cliffs, **1**, 29 (p).
- hardening of, by Kuhlmann's process for the silicification of limestones, **1**, 11 (p).
- products of the distillation of sal-ammoniae with, **23**, 252.
- Chalk formation, deposits of soluble or gelatinous silica in the lower beds of the, **6**, 102.
- Chalk, red, analysis of, **16**, 79.
- Chalks for marking cloth, &c., **25**, 1142.
- Chalybeate water, Cambray, **1**, 195.
- Chalybeate water from Melrose, **25**, 60.
- Chamaerops, wax of, **111**, 24.
- Chamellia japonica*, examination of, **1**, 219.
- Chamomile oil, blue, **24**, 258.
- Chamomile, Roman, contributions to the chemical history of, **25**, 171.
- Change of material in the adult sheep under uniform feeding, **24**, 729.
- Charcoal, absorption of vapours by, **18** 285; **20**, 160; **21**, 186; **23**, 73.
- contraction of, by long exposure to heat, **22**, 122.
- determination of, in vegetable ash, **11**, 186.
- effect of, in facilitating the escape of gases from liquids, **22**, 138, 143, 150.
- effects of pressure on the absorption of gases by, **24**, 76.
- effects of temperature on the absorption of gases by, **25**, 649.
- experiments on oxidation by means of, **20**, 293.
- Charcoal, animal, action of, **11**, 326.
- — action of, in sugar-making, **25**, 937.
- — analysis of, **22**, 111, 115.
- — colour-absorbing power of, as affected by the presence of calcium phosphate, **22**, 123.
- — filtration of syrup through, **22**, 109.
- — removal of mineral salts from, by washing, **22**, 113.
- — revivifying of, **22**, 118.
- — use of, for the decoloration of sugar-solutions in polarimetric analysis, **24**, 763.
- Charcoal, platinised, **8**, 105.
- Cheironomas*, hemoglobin in, **25**, 256.
- Chemical action of water on soluble salts, **11**, 36.
- Chemical affinity, circumstances modifying the action of, **9**, 54.
- Chemical analysis by spectrum observation, **13**, 270.
- Chemical apparatus, improved forms of, **111**, 315.
- Chemical change, observation of the course of, **20**, 460.
- — condition of certain elements at the moment of, **4**, 194.
- Chemical combination, actinic influence on, **11**, 317.
- — its influence on specific refractive energy, **18**, 113.
- Chemical composition, boiling point, and specific volume, relations between, **3**, 104.
- Chemical compounds, some cases of the formation of, by insufficient affinities, **25**, 392.

- Chemical dynamics, a law in, **24**, 1123.
 ——— some principles of, illustrated by Deacon's method of obtaining chlorine, **25**, 725.
- Chemical effects produced by the heat of the electric discharge, **25**, 211.
- Chemical equations, construction of, from the data afforded by experiment, **21**, 402.
- Chemical geology, **21**, 213.
- Chemical intensity of total daylight, measurement of, at Catania, during the total eclipse of December 22, 1870, **24**, 1141.
- Chemical lamp-furnace, **11**, 218.
- Chemical and molecular actions, researches on the quantities of heat disengaged in, **6**, 234.
- Chemical motion, absolute magnitude of, **24**, 300.
- Chemical nomenclature and notation, **17**, 421.
- Chemical operations, calculus of, **21**, 367.
- Chemical rays, absorption of, by reflection from polished surfaces, **17**, 76.
 ——— absorption of, by transmission through gases, **17**, 72.
 ——— absorption of, by transmission through liquids, **17**, 71.
 ——— absorption of, by transmission through solids, **17**, 62.
 ——— absorption of, by transmission through vapours, **17**, 72.
- Chemical substances, symbols of the units of, **21**, 405.
- Chemical substitution in plants, **24**, 428.
- Chemical symbols, on the construction of, **21**, 367.
- Chemico-legal investigations, mode of precipitating all the metals contained in a liquid by one operation in, **3**, 162.
- Chemistry, considerations on some points in the theoretic teaching of, **25**, 941.
- Chemistry, animal, researches in: by J. v. Liebig, **11**, 290.
- Chemistry of digestion, **15**, 407.
 ——— of opium, **15**, 446.
- Chemistry, organic and mineral, oxide of ethylene considered as a link between, **15**, 387.
- Chessylite, action of salt on, **22**, 24.
- Chicory, action of chemical reagents on infusion of, **9**, 48.
 ——— analysis of the ash of, **9**, 45.
 ——— characters of, **9**, 53.
 ——— quantity of sugar in, **9**, 42.
- Chile, some minerals from, **14**, 153.
- Chile saltpetre and iodine industry of Tarapaca, **25**, 1131.
- China Isles, ammonium bicarbonate of the, **16**, 74.
- Chinese green (Lokao), **25**, 706.
- Chinese oil bean, **25**, 1034.
- Chinese tallow from *Stillingia sebifera*, **8**, 1.
- Chinese wax, action of nitric acid on, **10**, 167.
 ——— oxidation of, **5**, 24.
 ——— products of oxidation of, **10**, 166.
- Chinese wax and nitric acid, volatile acids present in the distillate from, **10**, 177.
- Chinoline or quinoline, **25**, 657.
- Chinoline, colouring matters of, **14**, 244.
- Chinoline colours, dyeing of silk with, **14**, 250.
 ——— dyeing of wool with, **14**, 251.
- Chinoline and leucol, identical, **11**, 384.
- Chinoline and leucoline series, **16**, 375.
- Chloracetamide, **24**, 150.
- Chloracetate, ethylic, action of potassium nitrite on, **25**, 608.
- Chloracetene, **25**, 491.
- Chloracetic acids, action of sulphuric acid on, **24**, 125.
- Chloracetone, **24**, 921.
- Chloral, **25**, 246.
 ——— action of certain amido-compounds on, **25**, 611.
 ——— action of, on aniline, **24**, 931.
 ——— action of dry cyanic acid vapour on, **25**, 407.
 ——— action of phosphorus bromochloride on, **25**, 247.
 ——— combination of, with alcohols and amides, **24**, 257.
 ——— conversion of, into aldehyde by inverse substitution, **24**, 134.
 ——— derivatives of, **25**, 494.
 ——— formation of, **25**, 610.
 ——— reaction of, with aqueous hydrocyanic acid, **25**, 485.
- Chloral alcoholate, action of phosphorus pentachloride on, **24**, 255, 696.
- Chloral, crotonic, **25**, 495.
- Chloral cyanhydrate, **25**, 408.
- Chloral hydrate, action of potassium sulphite on, **25**, 389.
 ——— analysis of, **24**, 254.
 ——— as an antiseptic, **25**, 940.
 ——— detection of alcohol in, **24**, 163.
 ——— estimation of the value of, **24**, 444.
 ——— physiological action of, **24**, 748.
 ——— some properties of, **25**, 691.
 ——— tests for, **24**, 254.

- Choral hydrate, valuation of, **24**, 134, 761.
- Chloral hydrate and alcoholate, **24**, 253.
- — — and alcoholate, action of acetyl chloride on, **25**, 216.
- — — crotonic, **24**, 557.
- Chloral sulphhydrate, **25**, 612.
- Chlorallyl sulphocyanate, **25**, 479.
- Chlorallyl-ethyl ether, **25**, 479.
- Chloraloin, **25**, 205.
- Chloralum, **25**, 930.
- Chloranil, **II**, 227.
- action of sulphurous acid on, **21**, 146.
- analyses of, **21**, 144.
- preparation of, from phenol, **21**, 141.
- preparation of, from picric acid, **21**, 144.
- Chloranil and bromanil, **23**, 6.
- Chloranilic acid, **23**, 6.
- Chloraniline, **II**, 273.
- action of anhydrous baryta and lime on, **II**, 284.
- action of carbon disulphide on, **25**, 510.
- action of chlorine and bromine on, **II**, 283.
- action of ethyl bromide on, **3**, 290.
- action of nitric acid on, **II**, 283.
- action of the oxygenated compounds of chlorine on, **II**, 281.
- action of potassium on, **II**, 285.
- compounds of, **II**, 276.
- products of the decomposition of, **II**, 281.
- properties of, **II**, 274.
- Chloraniline binosalate, **II**, 278.
- Chloraniline hydrochlorate, **II**, 280.
- Chloraniline phosphate, **II**, 280.
- Chloraniline sulphate, **II**, 277.
- Chloranthracene, **15**, 51.
- Chlorate of ammonium, spontaneous decomposition of the, **I**, 54 (p).
- Chlorate of barium, preparation of, **25**, 599.
- Chlorate of potassium, action of heat upon, **24**, 1152.
- — — chemical actions exerted upon, by various substances, **24**, 1156.
- — — determination of heat evolved by burning of various substances with, **21**, 34.
- — — intimate action of substances which assist the decomposition of, **III**, 361; **24**, 1151.
- — — preparation of, **3**, 106; **25**, 1075.
- Chlorate of thallium, **17**, 140.
- Chlorates, specific heat of, **19**, 201.
- Chlorates, volumetric estimation of, **8**, 229.
- Chlorethyl oxide, **24**, 513.
- Chlorethylated triethylphosphonium, platinum-salt of, **14**, 317.
- Chlorethyl-benzene, **24**, 258.
- Chlorethylidene-propionic acid, products obtained by boiling, with milk of lime, **24**, 362.
- Chlorethylsulphuric acid, **15**, 96.
- Chlorethylsulphuric acid, conversion of, into taurine, **15**, 101.
- Chlorethylsulphurous acid, product of the decomposition of, **25**, 997.
- Chlorhydranil, **21**, 145.
- Chlorhydrated sulphuric acid, **10**, 99.
- Chlorhydrin, **6**, 287.
- Chlorhydrin of silicic ether, **24**, 918.
- Chlorhydrinimide, **25**, 685.
- Chloride of acetyl, or acetic chloride, **5**, 226.
- — — action of, on benzo-tartaric ether, **20**, 144.
- — — action of, on tartaric ether, **20**, 145.
- Chloride of allyl-alcohol, transformation of, into the isomeric dichlorhydrin, **25**, 999.
- Chloride of ammonium, absorption of, by ferric oxide, **21**, 12.
- — — diffusion of, **4**, 100.
- Chloride of amyl, normal, **24**, 1033.
- Chloride of arsenethylium, **7**, 267.
- Chloride of arsenetriethyl, **7**, 266.
- Chloride of barium, diffusion of, **4**, 91.
- Chloride of benzoyl, action of, on azodimethylhydramine, **16**, 214.
- — — action of, on tartaric and paratartaric ethers, **20**, 138.
- Chloride of benzoyl and aldehyde-ammonia, compound produced from, **9**, 265.
- Chloride of butyl, **24**, 809.
- Chloride of cajupute, **14**, 67.
- Chloride of cacoplatyl, **1**, 64.
- Chloride of calcium, diffusion of, **4**, 93.
- Chloride of capryl, **7**, 288.
- Chloride of carbon, derivatives of, **24**, 900.
- — — Jolin's, **20**, 443.
- — — — synthesis of, **25**, 996.
- Chloride of chlorethylsulphuric acid, **15**, 96.
- Chloride of copper, diffusion of, **4**, 100.
- Chloride of cyanogen, action of, on the ammonia bases, **7**, 184.
- — — action of, on benzylic alcohol, **24**, 926.
- — — action of, on naphthylamine, **9**, 8.
- — — action of, upon toluidine, **3**, 154.

- Chloride of cyanogen, heat evolved in the formation of, **24**, 985.
- Chloride of cyanogen and titanium, **3**, 177.
- Chloride of diamylamine, oxidation of, **21**, 162.
- Chloride of didymium, **6**, 265.
- Chloride of diplatosammonium, compounds of, with the chlorides of copper, iron, lead, mercury, tin, and zinc, **5**, 213—219.
- Chloride of ethyl, action of, upon ammonia, **13**, 331.
- action of chlorine on, **24**, 696.
- Chloride of ethylene, **11**, 96.
- Chloride of heptyl, **16**, 426.
- monochlorinated, **16**, 427.
- Chloride of iodine, absorption-spectrum of, **25**, 462.
- action of, on aniline, **17**, 328.
- action of, on benzoic acid, **17**, 332.
- action of, on carbazotic acid, **17**, 332.
- action of, on opianyl, **9**, 276.
- action of, on orcin, **17**, 327.
- action of, on phloridzin and salicin, **17**, 331.
- compound obtained from benzene by the action of, **7**, 244.
- Chloride of lead, solubility and crystallisation of, in water and in aqueous hydrochloric acid of various strengths, **21**, 350.
- Chloride of lime, action of, on aniline, **22**, 25.
- spontaneous decomposition of, **13**, 84.
- Chloride of lime and hydrochloric acid, action of, on morphine, **24**, 265.
- Chloride of manganese, diffusion of, **4**, 93.
- Chloride of menthyl, **15**, 27.
- Chloride of methyl, Regnault's chlorinated, **22**, 260.
- Chloride of methylene produced by action of chlorine on potassium acetate, **22**, 191.
- Chloride of methylene, remarks on, **22**, 262.
- Chloride of methylplumbethyl, **7**, 270.
- Chloride of nitrogen, **7**, 51.
- explosion of, **23**, 45.
- Chloride of oxethyl-triethylphosphonium, **14**, 84.
- Chloride of phenyl, **7**, 238.
- compound obtained by the action of fuming sulphuric acid on, **10**, 102.
- Chloride, phosphoric, action of, on sycocerylic alcohol, **15**, 73.
- Chloride, phosphorous, action of bromine on, **25**, 385.
- action of, on anhydrides and chlorides, **25**, 222.
- decomposition of, by water, **25**, 223.
- Chloride, potassio-thallic, **25**, 988.
- Chloride of potassium, absorption of, by ferric oxide, **21**, 10.
- diffusion of, **4**, 97.
- peculiar efflorescence of, **8**, 30.
- Chloride of potassium and sodium sulphate, diffusion of a mixture of, **15**, 234.
- Chloride of propylene. See Propylene chloride.
- Chloride propylic, **24**, 808.
- Chloride of salicyl, **7**, 62.
- Chloride of selenethyl, **7**, 94.
- Chloride, silicoheptylic, **25**, 156.
- Chloride of silicon and hydrogen, **11**, 91.
- Chloride of silver, action of light on, **10**, 74.
- crystallised or allotropic, **10**, 242.
- non-volatility of, at high temperatures, **21**, 507.
- reduction of, by hydrogen, **24**, 1009.
- refraction and dispersion of light in, **24**, 653.
- solubility of, **25**, 123.
- solubility of, in strong nitric acid, **25**, 453.
- Chloride of sodium, abnormal crystals of, **24**, 1178.
- action of bromine-water on, **15**, 478.
- diffusion of, **4**, 96 ; **15**, 225—236.
- diffusion of mixtures of, with the sulphates of sodium and potassium, **15**, 231, 232, 234.
- density and expansibility of aqueous, **24**, 1127.
- determination of, in urine, **6**, 1.
- determination of urea in urine containing, **6**, 25.
- compound of, with cane-sugar, **24**, 270.
- formation of transparent cubes of, **24**, 310.
- hydrated, from Etna, **24**, 1173.
- preparation of normal solution of, for determining the amount of mercury in a solution of protonitrate, **6**, 15.

Chloride of sodium, preparation of the test-liquor for the determination of, in urine, **6**, 10.

— — — supersaturated solution of, **25**, 284.

Chloride of sorbyl, **12**, 50.

Chloride of sparleine, **15**, 3.

Chloride of stannethylum, **6**, 60.

Chloride of stibethyl, **5**, 70.

Chloride of stibmethylum, **5**, 68.

Chloride of stibtriamyl, **9**, 283.

Chloride of stibtriethyl, **9**, 281.

Chloride of strontium, diffusion of, **4**, 92.

Chloride of succinyl, action of, on tartaric ether, **20**, 143.

Chloride of sulphur, action of, on orcin, **20**, 223.

Chloride of tellurethyl, **5**, 72.

Chloride of triethylphosphine, **11**, 69.

Chloride of triethyl-silicic acid, **24**, 918.

Chloride of tetrethylstibine, **13**, 119.

Chloride of vinyl-triethylarsonium, **14**, 337.

Chloride of zinc, reaction of, with nitrite of amyl, **20**, 579.

Chloride of zinc and sparleine, **15**, 5.

Chloride and orthovanadate of lead, **24**, 34.

Chlorides, action of boracic acid on, **12**, 164.

— action of phosphorous chloride on, **24**, 491 ; **25**, 222.

— atomic volume and specific gravity of, **11**, 440.

— volumes of certain, in solution and in the solid state, **11**, 446.

Chlorides of acetylene, **25**, 996.

Chlorides of aciamides, **25**, 413.

Chlorides, alkaline, action of oxalic acid upon, **1**, 231.

Chlorides, double, containing diplatos-ammonium, **5**, 213.

Chlorides of hydrogen and the alkali-metals, precipitation of dilute silver-solutions by the, **25**, 25.

Chlorides of hydrogen and ethyl, compounds obtained by the action of anhydrous sulphuric acid on, **10**, 97.

Chlorides of iron, diffusion of, **4**, 94.

Chlorides, organic, containing oxygen, action of sulphuric acid on, **24**, 125.

Chlorides of phosphorus, **25**, 38.

Chlorides of potassium and sodium, diffusion of a mixture of, **15**, 230.

Chlorides of silicon, **24**, 999.

Chlorides of sulphuryl, **24**, 489.

Chlorides of thallium, **17**, 138.

Chlorides of tolylene, **25**, 817.

Chlorides of tungsten, **25**, 287.

Chlorides of vanadium, **23**, 344.

Chlorides and urea, estimation of, in urino

in presence of potassium iodide, **25**, 1124.

Chlorimetry, improvements in, **24**, 1084 ; **25**, 1039.

Chlorinated acids, formation of, **24**, 551.

Chlorinated compound, $C_{10}H_{18}Cl_2O_3$, **25**, 617.

Chlorinated phenylic mustard-oil, **25**, 510.

Chlorindatmit, true composition of, **11**, 306.

Chlorine, absorption of, in water, **8**, 14.

— absorption-spectrum of, **25**, 462.

— action of, on acetates and salts of other acids, **22**, 190.

— action of, on acetate of potassium in aqueous solution, **22**, 187.

— action of, on absolute alcohol, **24**, 345.

— action of, on aldehyde, **24**, 556, 1056.

— action of, on amyl, **16**, 427.

— action of, on aniline, **11**, 270.

— action of, on arsenious acid, **18**, 62.

— action of, on chloraniline, **11**, 283.

— action of, on codeine, **4**, 118.

— action of, on conine, **1**, 352.

— action of, on Dutch liquid, **1**, 79.

— action of, on ethyl-amyl, **16**, 426.

— action of, on ethyl-chloride, **24**, 696.

— action of, on hydrocyanic acid in alcoholic solution, **24**, 136.

— action of hyponitric acid upon aqueous solutions of, **11**, 143.

— action of, on isopropyl chloride, **25**, 134.

— action of light on, **25**, 28.

— action of, on bibasic meconate of ammonia, **6**, 73.

— action of, on melaniline, **1**, 298.

— action of 2 vols. of, upon 1 vol. of methyl, **3**, 339.

— action of, upon an equal volume of methyl, **3**, 338.

— action of, on nitrite of amyl, **11**, 248.

— action of, on nitromesidine, **2**, 120.

— action of, on opianyl, **9**, 275.

— action of, on papaverine, **8**, 285.

— action of, on styphnic acid, **19**, 237.

— action of, on styrol, **11**, 346.

— action of, on solutions of sugar, **14**, 31.

— action of, on the sulphides of ethyl and their derivatives, **13**, 45.

— action of, on various bodies of the 3-carbon series, and on the isomerides of trichlorhydrin, **24**, 1190.

— affinity of, for hydrogen, **25**, 215.

— application of, to the toughening and refining of gold, **21**, 506.

- Chlorine, commercial, manufacture of, **25**, 846.
- Deacon's method of obtaining, **25**, 725.
- decomposition of oxides and salts by, **11**, 234.
- detection of, in organic bodies, **25**, 1039.
- determination of available, in bleaching powder, **24**, 751, 858.
- determination of, in neutral liquids by means of protoxide of mercury, **6**, 7.
- electric spectra of metals in, **17**, 87.
- estimation of, by ammonio-ferrous sulphate, **25**, 523.
- estimation of, by Carius's method, **25**, 1039.
- growth of maize in solutions destitute of, **24**, 1082.
- heat produced by the combination of metals with, **6**, 247.
- occurrence of, in the Bonnington water, **11**, 208.
- occurrence of, in vegetable ash, **11**, 189.
- passage of, through heated platinum, **20**, 261.
- production of organic bases containing, **11**, 266.
- separation of, from bromine and iodine, **10**, 234.
- substitution of, for hydrogen in organic compounds, **15**, 41.
- symbol of, in Brodie's chemical calculus, **21**, 415.
- uselessness of ammonio-ferrous sulphate for the estimation of, **24**, 753.
- volumetric estimation of, **8**, 223; **24**, 436.
- volumetric estimation of, in waters, **15**, 474.
- Chlorine and bromine together, volumetric determination of, **8**, 225.
- Chlorine and iodine together, volumetric determination of, **8**, 224.
- Chlorine and nitric acid, action of, upon platino-sulphocyanides, **7**, 40.
- Chlorine bisulphide, action of, on ethylene, **12**, 113; **13**, 36.
- Chlorine oxides and oxygen-acids, action of, on chloraniline, **11**, 281.
- Chlorine peroxide, preparation of, **11**, 193.
- Chlorine tetroxide and trioxide, absorption-spectra of, **25**, 280.
- Chlorine-compounds, specific heat of, **19**, 197, 225.
- Chlorine-group, spectra of bodies belonging to the, **24**, 1144.
- Chlorine-substitution-products of aniline, **19**, 64.
- Chlorine-substitution-products of ethyl chloride, **25**, 394.
- Chlorisatin, action of fused potassium hydrate on, **11**, 272.
- Chlorite family, **24**, 206.
- Chlorites and hypochlorites, volumetric determination of, **8**, 226.
- Chlorobasic acid, **2**, 236.
- Chlorobenzoic acid, **18**, 306.
- Chlorobenzylsulphurous acid, **25**, 1096.
- Chlorobromide of silver, **10**, 239, 240.
- Chlorobromides of carbon, two new, **25**, 232.
- Chlorobrominated ethylene, **17**, 420.
- Chlorobromiodhydrin, **24**, 907.
- Chlorobromonitrin, **24**, 907.
- Chlorobutyric aldehyde, **25**, 616.
- Chlorocarbon, oxalate of, **11**, 365.
- Chlorocarbonate of lead, **23**, 38.
- Chlorochromate of potassium, **25**, 47.
- Chlorocitromalic acid, **25**, 78, 145.
- Chlorocodaine, **4**, 118.
- Chlorocodide, **24**, 404.
- Chlorocomenic acid, **4**, 368.
- Chlorocoumarins, α and β , constitution of, **24**, 54.
- Chlorocresylsulphurous acid, **25**, 1096.
- Chlorocrotonic acid, **24**, 1046.
- Chlorodibromaniline, **11**, 288.
- Chloro-dicodaine-dimorphine, **24**, 932.
- Chloroform, action of bromide of iodine on, **24**, 778.
- action of bromine on, **25**, 232.
- action of iodine protochloride and of bromine on, **25**, 888.
- derivatives of, **7**, 224.
- detection of alcohol in, **24**, 163.
- effect of a current of moist air on, **24**, 197.
- nitration of, **24**, 641.
- phenomena of capillary attraction observed with, **1**, 174.
- reaction of, **24**, 137.
- Chloroform-vapour, absorption of, by charcoal, **18**, 290.
- Chlorogenin, **5**, 58; **12**, 205.
- Chloromaleic acid, **13**, 12.
- obtained from tartaric acid, **16**, 199.
- Chloronaphthalic acid, **3**, 250.
- Chloronaphthoquinones and chlorotoluquinones, **23**, 135.
- Chloronitrobenzene, heat evolved in the formation of, **24**, 874.
- Chloronitrobenzenes formed from the platinum-salts of α - and β -diazonitrobenzene, **20**, 85.
- Chloronitrosulphate of glyceryl, **24**, 907.
- Chlorophenolsulphonic acids, **24**, 240.
- action of concentrated nitric acid on, **24**, 244.

- Chlorophosphuret of nitrogen, analysis of, **17**, 230.
 — — — and its products of decomposition, **13**, 135, 353; **17**, 225.
 — — — aromatic liquid obtained by the decomposition of, under the influence of alcohol, **3**, 362.
 — — — composition of, **3**, 139.
 — — — crystalline form of, **17**, 227.
 — — — properties of, **3**, 138.
 Chlorophthalic acid, action of sulphuric acid on, **24**, 125.
 Chlorophyll, absorption-bands of, **25**, 383.
 — — — action of light on, **25**, 158, 160.
 — — — optical characters of, **17**, 314.
 Chlorophyll and some of its derivatives, **24**, 1201.
 Chlorophyll cells, origin of the chemical work in the production of organic matter in, **25**, 516.
 Chlorophyll, faded, spectra of, **25**, 163.
 Chloropianyl, **9**, 275.
 Chloropierin, **17**, 154; **25**, 889.
 — — — action of potassium cyanide on, **19**, 352.
 — — — action of potassium sulphite on, **25**, 389.
 — — — formation of, by nitration of chloroform, **24**, 641.
 — — — formation of guanidine from, **19**, 251.
 Chloropierin and chloroform, action of, on acetate of potash, **18**, 31.
 Chloroplatinate of ammonium, action of ammonia on, **3**, 176.
 Chloroplatinate of ethylamine, **3**, 95.
 Chloroplatinate of methylamine, **3**, 94.
 Chloroplatinate of triethyl-sulphethyl, **17**, 106.
 Chloroplatinite of carbonyl, **24**, 1011.
 Chloroplatino-cyanide of potassium, **13**, 112.
 Chloropropionate ethylic, formation of, from ethylic lactate, **18**, 146.
 α -Chloropropionic acid, action of ammonia on, **24**, 127.
 Chloropropylene, identity of, as prepared from acetone or from allyl iodide, **24**, 1190.
 Chlororeins, **25**, 297.
 Chlororesorcin, **25**, 297.
 Chlororubian and chlororubiadin, **12**, 215.
 Chlorostyrol, **11**, 346.
 Chlorosulphate of ethyl, **10**, 100.
 Chlorosulphide of bichlorethylene, **13**, 40.
 Chlorosulphide of terchloramylene, **13**, 44.
 Chlorotetracodeine, **24**, 405, 932.
 Chlorotetramorphine, **24**, 932.
 Chlorotoluylic acid, **18**, 317.
 Chlorovaleraldehyde, **24**, 560.
 Chloroethyl-trichlorethylidene, **24**, 255.
 Chloroxynaphthalic acid, **14**, 246; **23**, 133, 135.
 Choleic acid, **1**, 417.
 Cholesterin, **25**, 807.
 — — — chemical constitution of, **1**, 418.
 — — — reaction of, with sulphuric acid, **25**, 1123.
 Cholesterylamine, **25**, 804.
 Cholestrophane, **3**, 90.
 Cholic acid, action of phosphorus chloride on, **24**, 381.
 — — — products of the decomposition of, **1**, 414.
 — — — resolution of, into glycocholic and non-nitrogenous acids, **1**, 344.
 Chondrigen, occurrence of, in the Tunicata, **25**, 309.
 Chondrodite of Pargas, relation of, to humite, **25**, 53.
 Chromate of aluminium, **4**, 301.
 — — — of barium, **25**, 385.
 — — — of chromic oxychloride, **24**, 1170.
 — — — of copper and potassium, **3**, 73.
 — — — of ethylene - hexethyl - diphosphonium, **14**, 99.
 — — — of potassium, action of, on thickening materials, **24**, 1223.
 Chromates, action of, on ammonium salts, **24**, 787.
 — — — atomic volume and specific gravity of, **1**, 448.
 — — — chromatic phenomena of, **10**, 87.
 — — — volumetric estimation of, **8**, 227.
 Chromates of nickel, **24**, 108.
 — — — of thallium, **17**, 142.
 Chromates and sulphates of the potash family, **1**, 116.
 Chrome-green, analysis of, **24**, 442.
 Chrome iron-ore, analysis of, **24**, 762.
 Chrome ore, analysis of, **25**, 177.
 Chrome-ores, new method for the analysis of, **5**, 194.
 Chromic acid, action of, on carbonic oxide, hydrogen, marsh-gas, and ethylene, **25**, 590.
 — — — action of, on datiscine and datiscetine, **9**, 233.
 — — — action of, on paraffin, **21**, 467.
 — — — action of, on styrol, **11**, 344.
 — — — analysis of some double salts of, **1**, 20.
 — — — decomposition of, by hydrogen peroxide, **16**, 326.
 — — — diffusion of, **4**, 89.
 — — — employment of, as an agent in voltaic arrangements, **1**, 61.

- Chromic acid, preparation of, **1**, 17 (**1**) ; **25**, 45.
 ——— products of the action of, on casein, **1**, 87.
 ——— volatile products of the decomposition of albumin, fibrin, casein, and gelatin by, **1**, 87.
 ——— products of the action of, upon casein, **1**, 87.
 ——— specific gravity of, **25**, 46.
 ——— and sesquioxide of manganese, compound of, **4**, 300.
 Chromic anhydride, oxidising action of, on various organic compounds, **25**, 142, 143.
 Chromic carbonate, **13**, 90.
 Chromic oxide, dialysis of soluble, **15**, 254.
 Chromic oxychloride, action of phosphorous chloride on, **25**, 222.
 Chromium, crystalline form of, **13**, 333.
 ——— modification of the reactions of, by citric acid, **10**, 110.
 ——— preparation of crystallised, **25**, 45.
 ——— specific gravity and atomic volume of, **11**, 60.
 Chromium-compounds, **1**, 391 ; **24**, 890 ; **25**, 47.
 Chromium-derivative obtained by heating potassium dichromate with nitric acid, **24**, 199.
 Chromium metaphosphate, **11**, 278.
 Chromium oxide, **11**, 82.
 ——— behaviour of some oxides with caustic potash in presence of, **6**, 54.
 Chromium oxychloride, **23**, 31.
 Chromium protoxide, **1**, 390.
 Chromium pyrophosphotriamete, **19**, 10.
 Chromium salts, chromatic phenomena of, **10**, 82.
 Chromium selenite, **2**, 62.
 Chromium sesquisulphide, **11**, 88.
 Chromium sulphite, **2**, 206.
 Chromium and potassium, oxalates of, **1**, 89, 93.
 Chromogen of *Boletus cyanescens* and other fungi which become blue after fresh fracture, **25**, 424.
 Chromogluco-side from the seed of *Melampyrum arvense*, **25**, 424.
 Chromometry, **24**, 183.
 Chromo-wulfenites, **24**, 501.
 Chronyl dichloride, specific gravity and boiling point of, **21**, 514.
 Chrysammates, metallic, **19**, 321.
 Chrysammic acid, **25**, 488.
 ——— crystalline form of, **19**, 321.
 ——— preparation of, **19**, 319.
 ——— products of decomposition of, **1**, 401.
 Chrysammic ether, **19**, 324.
 Chrysanisate of ammonium, **3**, 77.
 Chrysanisate of silver, **3**, 77.
 Chrysanisic acid, **3**, 77 ; **24**, 1054 ; **25**, 713.
 ——— constitution of, **24**, 555, 920.
 Chrysanisic acid and an isomeride in the meta series, **25**, 145.
 Chrysanisic ether, **3**, 78.
 Chrysene, **24**, 692 ; **25**, 445.
 Chrysenequinone, **24**, 693.
 Chrysocolla, **25**, 1053.
 Chrysohydroquinone, **24**, 693.
 Chrysophane, preparation of, **10**, 300.
 Chrysophanic acid obtained by extracting crude cathartin with ether, **25**, 152.
 Chrysophanine, preparation of, from infusion of senna, **25**, 153.
 Chrysorhammin, **13**, 327.
 Chyluria, composition of blood in, **24**, 740.
 Cimex-species, juice of the larvæ of, **25**, 157.
Cimicifuga racemosa, neutral crystallisable principle in, **24**, 409.
 Cinchona-alkaloids, general characters of their iodosulphates, **11**, 130.
 ——— separation and quantitative determination of, **25**, 337.
 Cinchona-bark, new alkaloid from, **24**, 61.
 Cinchona-barks, **25**, 80.
 ——— use of polarised light for the valuation of, **24**, 857, 1095.
 ——— the so-called false, **25**, 721.
 Cinchonidine, formula of, **11**, 150.
 Cinchonidine and quindine, action of heat on, **6**, 276.
 Cinchonine, **6**, 274 ; **25**, 103.
 ——— compound of, with iodide of mercury, **11**, 101.
 Cinchonine sulphate, product obtained by heating with hydrochloric acid, **24**, 931.
 Cinchonine tri-iodide, **24**, 399.
 Cinchonine and quinine, combination of, with hydroferrocyanic and hydroferri-ridecyanic acids, **1**, 407.
 Cinder, blast-furnace (slag), composition of, **15**, 314.
 Cinnabar, examination of an ore of, from New Almaden, California, **4**, 180.
 ——— from Almaden, Spain, **4**, 182.
 ——— from Moschellandsberg, **4**, 183.
 ——— from Wolfstein, **4**, 184.
 ——— a peculiar pseudomorph of, from Pola de Lena, in Asturia, Spain, **11**, 240.

- Cinnabar ores, table of composition of, **4**, 185.
- Cinnamene, or cinnamol, **11**, 353.
- Cinnamic acid, **13**, 135; **25**, 300.
- Cinnamon oil, artificial production of, **7**, 280.
- Circular polarisation, **13**, 254.
- — — as applied to chemical inquiries, **13**, 266.
- — — its application to the determination of what is going forward in a solution, **13**, 268.
- — — its application to the estimation of organic products, **13**, 266.
- — — its application to the examination of isomeric substances, **13**, 269.
- — — influence of magnetism or electricity on, **13**, 261.
- — — influence of state of aggregation on, **13**, 259.
- — — influence of state of combination or substitution on, **13**, 262.
- — — influence of solution on, **13**, 261.
- — — influence of temperature on, **13**, 260.
- — — quantitative determination by, **15**, 308.
- — — table of substances which exhibit it, **13**, 256.
- Circular polarisation and crystalline form, relation between, **13**, 264.
- Citraconic acid, explosion of, by heating with liquid nitrogen tetroxide, **25**, 146.
- Citradibromopyrotartaric acid, isobutyric acid from, **25**, 814.
- Citrate of calcium, decomposition of, in contact with putrefying curd, **5**, 1.
- Citrate of thallium, **17**, 151.
- Citric acid, action of, in modifying the reaction of various acids and bases, **10**, 112.
- — — action of hydrobromic acid on, **24**, 1047.
- — — action of potassium permanganate on, **25**, 608.
- — — constitution of, **5**, 284.
- — — estimation of, **25**, 179.
- — — examination of, for crystals of tartaric acid, **25**, 330.
- — — osmose of, **8**, 69.
- — — transformations of, **15**, 141.
- — — use of, in preference to tartaric acid, for preventing the precipitation of iron and alumina in the determination of phosphoric acid by salts of magnesia, **16**, 306.
- Citrobianil, **5**, 285.
- Citrobianilate of silver, **5**, 286.
- Citrobianilic acid, **5**, 286.
- Citromonanilic acid, aniline salt of, **5**, 288.
- Citromonanilic acid, bibasic, silver-salt of, **5**, 288.
- Citromonanilic acid, monobasic, **5**, 287.
- Citronanilide, **5**, 285.
- Citronella, essential oil of, **17**, 8; **25**, 7.
- Citrus aurantium*, analysis of the ashes of, **11**, 370.
- Clarke's soap-test, action of, on Dee water, **4**, 126.
- — — degree of hardness of the waters of the eight principal London companies, determined by, **4**, 382.
- Classification of the elements in relation to their atomicities, **17**, 211.
- Clay, blue, from Wiltshire, analysis of, **15**, 323.
- Clay from Eisenberg, pyrometric examination of, **25**, 186.
- Clay, burnt, use of, as a fertiliser, **24**, 279.
- Clay ironstones, analyses of, **25**, 534.
- Clay-slates, microscopic constitution of, **25**, 294.
- Clays, general occurrence of titanitic acid in, &c., **15**, 311.
- — — improvement of refractory, for glass-making, **24**, 868.
- Clean and unclean surfaces in voltaic action, **24**, 990.
- Cleveland pig, analysis of, **25**, 540.
- Climate, effect of change of, on the human economy, **24**, 411.
- Cloth, &c., waterproofing and protection of, from moths, **25**, 856.
- Clove, oil of, **17**, 8.
- Clover, digestion of, **25**, 913.
- Clover hay, assimilation of, by sheep, **24**, 1074.
- — — percentage of fat and wax in, **24**, 1193.
- Clover sickness, **25**, 916.
- Clover, white, composition of the seed-shells of, **25**, 916.
- Coal, estimation of sulphur in, **24**, 1089.
- — — gases enclosed in, **24**, 899; **25**, 798, 801.
- — — origin of, **25**, 228.
- — — traces of copper and lead in the ashes of, **2**, 1.
- — — ultimate analysis of some varieties of, **1**, 318.
- Coal, Boghead, hydrocarbons produced in the destructive distillation of, **15**, 130.
- Coal, cannel, hydrides of the alcohol-radicals existing in the products of the destructive distillation of, **15**, 419.

- Coal, English, gases enclosed in, **25**, 801.
- Coal of Iowa, relative proportions of iron and sulphur in certain specimens of pyrites in the, **25**, 228.
- Coal-gas, analysis of, **11**, 309.
- carbon bisulphide in, **13**, 85.
- diffusion-velocities of the constituents of, **16**, 400.
- igniting point of, **16**, 398.
- oxide of iron for purification of, **25**, 188.
- passage of, through heated platinum, **20**, 262.
- Coal-gas and air, inflammation of mixtures of, by sparks, **16**, 402.
- Coal-gas carbon and nitric acid voltaic battery, **9**, 198.
- Coal-mines, composition of the fire-damp of the Newcastle, **111**, 7.
- Coal-oils, the most volatile, **25**, 1002.
- Coals, calorific value and composition of two Welsh, **25**, 91.
- Coal-tar, **1**, 244.
- colouring matters derived from, **14**, 230.
- constitution of commercial creosote from, **7**, 232.
- cresols of, **24**, 531.
- products usually obtained from, **1**, 249.
- products of, boiling between 161° and 169°, **25**, 241.
- Coal-tar colours, how affected by artificial light, **14**, 254.
- dyeing of leather with, **25**, 1046.
- their application to the dyeing of silk and wool, **14**, 250.
- method of dyeing cotton with, **251**.
- their preparation not injurious to workmen, **14**, 255.
- printing calico with, **14**, 252.
- spectra produced by, **14**, 254.
- Coating of metals with nickel and cobalt, **24**, 972.
- Cobalt, ammoniacal compounds of, **4**, 355.
- atomic weight of, **16**, 51; **22**, 294; **24**, 1006.
- coating of metals with, **24**, 972.
- detection of, by sodium sulphocyanate, **24**, 580.
- effect of black oxide of, in facilitating the decomposition of potassium chlorate, **24**, 1155.
- modification of the reaction of, by citric acid, **10**, 114.
- new saline compound of, **7**, 86.
- Cobalt, preparation of chemically pure, and qualitative examination of substances containing, **4**, 361.
- quantitative separation of, from potash and soda, **2**, 99.
- separation of nickel from, **1**, 157.
- specific gravity and atomic volume of, **111**, 59, 70.
- solubility of, **11**, 20.
- testing for, with potassium ferri-cyanide, **24**, 757.
- Cobalt bisulphide, **111**, 88.
- Cobalt carbonate, **14**, 49.
- Cobalt hyposulphite, **23**, 430.
- Cobalt leucate, **14**, 310.
- Cobalt metaphosphate, **111**, 277.
- Cobalt peroxide, volumetric estimation of, **8**, 230.
- Cobalt phosphite, **20**, 366.
- Cobalt protoxide and peroxide, **111**, 81.
- Cobalt, pyrophosphotriamete, **19**, 9.
- Cobalt salts, chromatic phenomena of, **10**, 83.
- osmose of, **8**, 89.
- Cobalt selenites, **2**, 65.
- Cobalt-base, Claudet's, mercury salt of, **4**, 355.
- Claudet's, platinum-salt of, **4**, 355.
- Cobalticyanides, **24**, 389.
- Cobalt-ultramarine, **24**, 860, 1221.
- Cobalt-yellow, **7**, 90.
- lead-salt corresponding with, **13**, 335.
- Coccus Cacti*, **111**, 454.
- Cochineal, **111**, 454.
- action of calcium salts on decoction of, **25**, 1099.
- colouring matter of, **24**, 912; **25**, 706.
- microscopic examination of living, **111**, 459.
- new body obtained from, **111**, 110.
- separation of the colouring matter from, **111**, 459.
- spectroscopic characters of the ammoniacal solution of, **24**, 1096.
- testing of, **24**, 601.
- Cockchafers, preparation of melolonthine from, **24**, 1201.
- Codamine, **25**, 723.
- Codaine, **15**, 450.
- action of alkalis on, **4**, 120.
- action of bromine on, **4**, 116.
- action of chlorine on, **4**, 118.
- action of cyanogen on, **4**, 119.
- action of hydracids on, **25**, 505.
- action of hydriodic acid on, in presence of phosphorus, **25**, 150.

- Codeine, action of hydrobromic acid on, **24**, 404.
 — action of ethyl iodide on, **6**, 134.
 — action of sulphuric acid on, **4**, 115.
 — composition of, **4**, 112.
 — constitution and products of decomposition of, **4**, 112.
 — microscopical characters of, **18**, 36.
 — oxidation of, **21**, 164.
 — polymerisation of, **25**, 506.
 — preparation of, **4**, 112.
 — products obtained from, by the long-continued action of hydrobromic acid, **24**, 932.
 — products of decomposition of, **4**, 115.
 Codeine, amorphous, **4**, 115; **24**, 56.
 Codeine salts, **4**, 113.
 Codorus ore of Pennsylvania, **25**, 59.
 Cœrulein and cœrulin, **24**, 833.
 Coffee, action of chemical reagents on infusion of, **9**, 48.
 — amount of caffeine in, **25**, 897.
 — analysis of the ash of, **9**, 44.
 — chemical report on the mode of detecting vegetable substances mixed with, for the purpose of adulteration, **9**, 33.
 — quantity of caffeine in raw, **9**, 51.
 — quantity of sugar in, **9**, 41.
 — silica in roasted, **9**, 43.
 Coffee-bean, composition of the raw, **9**, 49.
 Coins struck prior to the Christian era, analyses of, **4**, 263.
 — struck since the commencement of the Christian era, analyses of, **4**, 280.
 Coke, application of the Sprengel mercurial pump to the analysis of, **25**, 321.
 — estimation of sulphur in, **24**, 1089.
 Cokes used in iron smelting, composition of, **25**, 553.
 Cold, alleged action of, in rendering iron and steel brittle, **24**, 167, 444.
 — generation of, by means of methylether, **25**, 532.
 Cold-short iron, **25**, 560.
 Collidine acid, **14**, 56.
 Collodion, preparation of, **25**, 272, 532.
 — sensibility of, as affected by the varying proportions of pyroxilin and iodising salts, **25**, 1137.
 Collodion-paper, preparation of, **25**, 337.
 Colloid liquids, separation of arsenious acid from, **15**, 261.
 Colloid septa, absorption and dialytic separation of gases by, **20**, 235.
 Colloid silica obtained by dialysis, occurrence of organic appearances in, **21**, 274.
 Colloid substances, **15**, 217.
 — — dialysis of organic, **15**, 256.
 — — preparation of, by dialysis, **15**, 243.
 — — properties of silicic acid and other analogues, **17**, 318.
 — — containing mercury, **24**, 561.
 Colloidal condition of matter, **15**, 264.
 Colophene, **17**, 19.
 — isomerides of, **25**, 3.
 Colorimeter, quick approximative method of estimating minute quantities of iron by means of a, **5**, 27.
 Colorimeters, **24**, 1223; **25**, 527.
 Colour estimation, **25**, 527.
 Colour of opaque media, **25**, 30.
 Colour of a water, mode of observing the, **18**, 118.
 Coloured reflection, relation of, to absorption, **17**, 315.
 Coloured tissues of plants, action of electricity on, **24**, 796.
 Colouring matter, estimation of, by spectrum analysis, **24**, 602, 759, 760.
 — — union of, with cotton, **16**, 1, 404.
 Colouring matter and oxalic acid, recovery of, from the wash-waters of madder in garancin making, **24**, 768.
 Colouring matter of blood, separation of, by a solution of tannin, **25**, 929.
 Colouring matter of cochineal, **24**, 912; **25**, 706.
 Colouring matter found in the sarcophagus of St. Ambrose, at Milan, **25**, 1103.
 Colouring matter of sugar, precipitation of, by a metallic oxide, **3**, 55.
 Colouring matter of turmeric, **24**, 152.
 Colouring matter, blue, in the bile, **24**, 1204.
 — — blue, derived from eserine, **24**, 719.
 — — red, of madder, **3**, 243.
 — — secondary, produced in the preparation of alizarin from anthracene, **25**, 659.
 Colouring matters derived from the aromatic azodiamines, **25**, 695.
 — — derived from coal-tar, **14**, 230.
 — — derived from dinitrobenzene, dinitronaphthalene, &c., **9**, 1.
 — — derived from diphenylamine, **25**, 1046.
 — — new class of, **24**, 833.

- Colouring matters of Persian berries, and certain general relations of yellow vegetable substances, **13**, 327.
- Colouring matters of quinoline or chinoline, **14**, 244.
- Colouring powers, table of, of the various vegetable substances (roasted) dissolved in an equal quantity of water, **9**, 37.
- Colour-photography, so-called, **25**, 30.
- Colours, influence of various, on vegetation, **25**, 261.
- Colours (coal-tar) application of, to the dyeing of silk and wool, **14**, 250.
- Colours of metals, **25**, 119.
- Colours from naphthalene, **14**, 246.
- Colours of natural objects, theory of, **24**, 1150.
- Colours, organic, argument for the binary theory of salts, derived from the non-action of the anhydrous oxygen-acids on, **1**, 332.
- Colours of the spectrum, influence of the, on the decomposition of carbon dioxide by plants, **25**, 1107.
- Colours fixed on stuffs, note on the stability of, **25**, 1144.
- Colour-yielding matter of lichens, mode of estimating the amount of, **20**, 226.
- Columbite from Erigtok, in the fiord of Arksut in Greenland, **11**, 243.
- Columbite, minerals isomorphous with, **25**, 203.
- Columbites, composition of, **24**, 1013.
- Combination, chemical, or substitution, influence of, on circular polarisation, **13**, 262.
- Combination, direct and indirect, **22**, 362.
- heat disengaged in, **1**, 106.
- Combustible gas, absence of, in the emanations of the Caldeira de Furnas, San Miguel, Azores, **25**, 885.
- Combustion, influence of atmospheric pressure on some of the phenomena of, **15**, 168.
- influence of compression of the air on the light of, **15**, 187.
- influence of rarefaction on the light of, **15**, 177.
- of candles, influence of atmospheric pressure on the rate of, **15**, 170.
- of iron in compressed oxygen, **17**, 52.
- of time-fuses, influence of atmospheric pressure on the rate of, **15**, 170.
- Combustion-blowpipe for organic analysis, **17**, 49.
- Combustion-furnaces, **24**, 438.
- Combustion-zone of the blast-furnace, estimation of the temperature of the, **25**, 1134.
- Comenamic acid, **4**, 370; **6**, 72.
- Comenates of ammonium, **11**, 118; **4**, 364, 370.
- Comenates, metallic, **11**, 8, 113, 118; **4**, 365—367.
- Comenic acid, action of bromine on, **4**, 369.
- — — action of chlorine on, **4**, 368.
- — — certain salts and products of decomposition of, **11**, 6; **4**, 363, 367.
- — — oxidation of, **4**, 367.
- — — preparation of, **4**, 364.
- Comenovic acid, **4**, 370.
- Comfrey, prickly, composition and nutritive value of, **24**, 1082.
- Compensation method, measurement of the internal resistance of voltaic batteries by the, **24**, 619.
- Composition and atomic heat, relations between, **19**, 203.
- Compound radical, definition of, **13**, 246.
- Compound testing jet, **4**, 39.
- Compounds, chemical, effect of time in the production of, **1**, 397.
- Compounds, conjugate, **11**, 360.
- Compressibility of liquids under high pressure, **25**, 974.
- Compression of the air, influence of, on the light of combustion, **15**, 187.
- Concretion, biliary, analysis of, **20**, 458.
- Condensation-products of aldehyde, **25**, 612, 617.
- Conduction, electric, by liquids, **25**, 207.
- — — without electrolysis, **25**, 209.
- Conductors, electromotive force of induction in liquid, **24**, 651.
- Condurrite, **1**, 213.
- Cones, use of porous hollow, as filters, **24**, 1083.
- Conglutin from lupines, oxidation of, by potassium permanganate, **25**, 830.
- Conime. See Conine.
- Conine, action of bichloride of platinum on, **1**, 358.
- action of bromine on, **1**, 352.
- action of chlorine on, **1**, 352.
- action of iodine on, **1**, 353.
- action of oxygen on, **1**, 356.
- products of decomposition of, **1**, 356.
- synthesis of, **24**, 143, 400; **25**, 416.
- Conine hydrochloride, **1**, 353.
- Conine salts, **1**, 353.
- Conine sulphate, **1**, 354.
- Conine and chloride of mercury, compound of, **1**, 355.
- Conine and platinum, double salts of, **1**, 354.

- Conjugate sulpho-acids, **9**, 256.
- Connective tissue of invertebrata, **25**, 633.
- Constant battery, new form of, **21**, 488.
- Constitution of matter, speculative ideas respecting the, **17**, 368.
- Constitutional formulae, **19**, 375.
- Cooling of gases, rate of, 972.
- Copernicia cerifera*, alcohol in the wax of, **7**, 192.
- Copper, absorption of hydrogen by, **20**, 280.
- action of ammonium sulphhydrate on, **25**, 981.
- action of heat on gold, and on its alloy with, **10**, 229.
- action of, on mercuric ethide, **17**, 36.
- action of sugar on, **7**, 199.
- action of sulphuric acid on, **19**, 438.
- addition of lead in the refining of, **25**, 340.
- amount of, in iron, **24**, 312.
- carbon in, **17**, 184.
- coinage, presence of bismuth in, **14**, 300.
- combination of, with glucose, **25**, 1122.
- composition of some varieties of native, **16**, 89.
- cooking vessels, enamel for, **25**, 850.
- detection of arsenic in, **16**, 247.
- detection of small quantities of, in solution, **5**, 137.
- determination of, in brass, by titration, **24**, 158.
- determination of, by electrolysis, **25**, 925.
- determination of, by potassium cyanide, **25**, 926.
- discovery of pure oxide of nickel in the seam arising from the smelting of, **11**, 384.
- electrodeposition of, **24**, 103.
- Elkington's improvement in the manufacture of, **24**, 1100.
- existence of, in certain waters, **24**, 1096.
- in fuci, **3**, 71.
- modification of the reactions of, by citric acid, **10**, 116.
- nitrogen in, **17**, 188.
- non-metallic impurities of refined, **17**, 164.
- occurrence of, in cajuput-oil, **25**, 529.
- oxygen in, **17**, 166.
- phosphorus in, **17**, 188.
- plates, corrosion of, by silver nitrate, **24**, 1008.
- Copper, precipitating reagent for, **24**, 1091.
- qualitative and quantitative examination of, containing antimony, arsenic, bismuth and lead, **14**, 291.
- reduction of the oxides of nitrogen, by metallic, in organic analysis, **19**, 359.
- reflecting power of, for chemical rays, **17**, 77.
- selenium in, **17**, 186.
- separation of bismuth from, **25**, 329.
- solubility of hydrated protoxide and suboxide of, in aqueous sodium hyposulphite, **16**, 29.
- specific gravity and atomic volume of, **11**, 60, 66, 70.
- specific gravity and atomic volume of melted, **11**, 77.
- sulphur in, **17**, 187.
- supposed native, **24**, 115.
- table showing the examination of different varieties of, for metallic impurities, **14**, 302.
- volumetric estimation of, **10**, 65; **24**, 594.
- Copper amalgam, **16**, 381.
- Copper ammonio-perchlorate, **16**, 88.
- amylophosphate, **9**, 137.
- anchoate, **10**, 173.
- arsenite, **15**, 292.
- azophosphate, **3**, 147.
- benzoglycolate, **5**, 77.
- bromacetate, **11**, 23.
- carbonates, basic, **14**, 48, 70.
- chloride, colour of, in different states of hydration, **8**, 211.
- chromate, **2**, 218.
- chrysammate, **19**, 323.
- comenates, **11**, 119; **4**, 367.
- diazo-amidobenzoate, **18**, 301.
- dicarbonate, action of sodium carbonate on, **14**, 71.
- dichloride (cuprous chloride), diffusion of, **4**, 101.
- dinitroethylate, **11**, 87.
- disulphometholate, **9**, 246.
- ethylotrithionate, **10**, 62.
- ferrocyanide, dialysis of, **15**, 251.
- hypogaates, **8**, 281.
- hyposulphamethylate, **1**, 53.
- hyposulphamylate, **1**, 377.
- hyposulphethylate, **1**, 49.
- insolinate, **9**, 212.
- malate, acid, **1**, 33.
- metaphosphate, **11**, 278.
- methylodithionate, **10**, 250.
- nitrate, **11**, 480, 484.
- — action of oxygen on, in a state of tension, **25**, 674.
- — diffusion of, **4**, 93.

- Copper nitrococcusate, III, 476.
 — nitrotoluylate, III, 437.
 Copper ores combined with sulphur, mode of treating, I, 8 (p).
 — — general distribution of mis-
 muth in, **14**, 304.
 — — observations on the weather-
 ing of, **20**, 306.
 Copper oxide, heat evolved in the com-
 bination of acids with, **6**, 247.
 Copper oxychloride, **8**, 213.
 — — action of heat on, **9**, 140.
 Copper pentabasic sulphate, I, 225.
 — phosphite, **20**, 373.
 — platino-tersulphocyanide, **7**, 32.
 — protochloride, action of hydro-
 chloric acid upon sulphide of mercury
 in presence of, **12**, 159.
 — protoxide, III, 82.
 — protoxide from Chile, **14**, 154.
 — pyromecconate, II, 3; **6**, 80.
 — pyrophosphotriamates, **19**, 8.
 Copper salts, action of bleaching powder
 on, II, 387.
 — — chromatic phenomena of, **10**,
 84.
 — — crystallisation of, I, 5.
 — — osmose of, **8**, 89.
 Copper selenites, **2**, 66.
 — selenocyanide, **4**, 19.
 Copper-solution, Fehling's, experiments
 with, **25**, 1122.
 Copper suboxide, III, 81.
 — subphosphide, use of, as a primary
 composition for igniting gunpowder
 by electricity, **14**, 184.
 — subsalts, constitution of, I, 221.
 — subsulphates, tabular arrangement
 of, I, 230.
 — subsulphide and sulphide, III, 88.
 — sucrate, dialysis of, **15**, 253.
 — sulphate, impurities in commercial,
 III, 2.
 — sulphide, action of hydrosulphate
 of ammonia on freshly precipitated,
18, 94.
 — sulphites, III, 296; **24**, 1169.
 — tetrabasic sulphate, I, 223.
 — thiophosphodiamate, **18**, 3.
 — tribasic sulphate, I, 222.
 — tricarballylate, **18**, 338.
 — toluylate, III, 430.
 Copper and ammonium, sulphite of, III,
 298.
 Copper and antimony, reciprocal pre-
 cipitation of, **9**, 291.
 Copper and arsenic, sulphide of, **12**,
 9.
 Copper and bismuth, reciprocal precipi-
 tation of, **9**, 291.
 Copper and cadmium, reciprocal preci-
 pitation of, **9**, 292.
 Copper and diplosammonium chloride
 of, **5**, 218.
 Copper and iron, double sulphides of,
15, 125.
 Copper, iron, and potassium, complex
 cyanide of, **15**, 357.
 Copper and lead, double sulphide of,
 from Chile, **14**, 160.
 — — reciprocal precipitation of,
9, 292.
 — — traces of, in the ashes of
 coal, **2**, 1.
 Copper, lead, tin, and antimony, analysis
 of alloys containing, **15**, 462.
 Copper and phosphorus, compounds of,
18, 249.
 Copper and potassium, chromate of, **3**,
 73.
 Copper and silver, natural alloy of, from
 Chile, **3**, 29.
 — — quick method of separating,
25, 926.
 — — reciprocal precipitation of,
9, 290.
 Copper and sodium, sulphite of, III,
 297.
 Copper and sugar, volumetric process
 for the estimation of, **25**, 1121.
 Copper and thallium, alloy of, **17**, 146.
 Copper and tin, alloys of. See Bronze.
 — — reciprocal precipitation of, **9**,
 291.
 Copper and zinc, alloy of, Cu_3Zn , **24**,
 1167.
 — — alloys of. See Brass.
 — — sulphantimonite, **6**, 140.
 Coppers, some results of the analysis of
 commercial, **14**, 290.
 Copper-zinc battery, new arrangement
 of, **25**, 780.
 Copper-zinc battery, Kohlfürst's, **24**, 480.
 Copying paper, permanent, for printed
 matter, **24**, 971.
 Coralline, **25**, 705, 1048.
 Coriander, oil of, **17**, 9.
Coriaria ruscifolia, or Tutu plant,
 poisonous principle of, **24**, 152.
 Coridine in tobacco-smoke, **24**, 1077.
 Cornbrash, manganese in, **18**, 207.
 Cornish minerals, **21**, 276.
 Corrosive sublimate, formation of, in
 mixtures containing calomel, **25**, 850.
 Corundum, **25**, 995.
 Cornwallite, **19**, 135; **21**, 276.
 Corona, spectrum of the solar, **25**, 590.
Coscinium fenestratum, preparation of
 berberine from, **20**, 187.
 Cotarnic acid, hydrochlorate, of, **16**,
 357.
 Cotarnic acid, formation of, from cotar-
 nine, **16**, 356.
 Cotarnine, **15**, 452.

- Cotarnine, action of hydriodic and sulphuric acids on, **16**, 358.
 — action of hydrochloric acid on, **16**, 356.
 — action of nitric acid on, **5**, 266; **16**, 356.
 — action of potash on, **16**, 358.
 — conversion of, into cotarnie acid and methylamine, by the action of nitric acid, **16**, 456.
 — composition of, **16**, 344.
 — decompositions and derivatives of, **16**, 356.
 — formation and preparation of, from narcotine, **16**, 345.
 Cotarnine hydrochloride, formation of, **11**, 171.
 Cotton, compounds of, with alkalis, **4**, 17.
 — dyeing of, with aniline-black, **25**, 1140.
 — mercerizing or artificial expansion of, by strong alkalis, **16**, 3, 406.
 — method of dyeing with coal-tar colours, **14**, 251.
 — dyeing of, with fuchsine, without mordants, **25**, 532.
 — increase sustained by, in its conversion into gun-cotton, **20**, 344.
 — substitution-compounds obtained by the action of nitric acid on, **7**, 201.
 — union of, with colouring matter, **16**, 1, 404.
 Cotton cloth, waterproofing of, **24**, 767.
 Cotton fibre, soluble phosphates in, **20**, 303.
 Cotton fibre, unripe, **16**, 405.
 Cotton, iodised, **24**, 967.
 Couch grass, supposed existence of mannite in the roots of, **11**, 139.
 Coumaric acid, **21**, 62; **22**, 191.
 Coumaramine, **8**, 301.
 Coumarilic acid, **24**, 45.
 Coumarin, artificial production of, and formation of its homologues, **21**, 53.
 — composition of, **11**, 209.
 — constitution of, **22**, 192; **25**, 1007.
 — bromine-derivatives of, **23**, 368.
 — constitution of bromo- and chloro-derivatives of, **24**, 53.
 — derivatives of, **24**, 37.
 — detection of, in *Anthoxanthum odoratum*, **11**, 218.
 — formation of, from the hydride of acetosalicyl, **21**, 185.
 — formation of coumaric and salicylic acids from, **11**, 212.
 — preparation of, from Tonka beans, **11**, 208.
 Coumarin, products of decomposition of, **11**, 209.
 Coumarin, acetic, **21**, 55.
 Coumarin butyric, **21**, 56, 474.
 Coumarin dibromide, **24**, 37.
 Coumarin dichloride, **24**, 43.
 Coumarin, valeric, **21**, 58.
 Cow, changes in composition of the milk of the, **1**, 174.
 Cow, influence of food on the production of milk in the, **24**, 414.
 Cream of tartar, estimation of, in wine, **24**, 1211.
 Creasote, action of phosphorus pentachloride on, **7**, 235.
 Creasote and phenol, distinction between, **25**, 929.
 Creasote, commercial, from coal-tar, constitution of, **7**, 232.
 Creatine, a constituent of the flesh of the cetacea, **3**, 229.
 — growth of maize in solutions containing, **24**, 1081.
 — preparation of, **1**, 25.
 — proportions of, contained in different kinds of flesh and fish, **1**, 25.
 Creatine and creatinine in urine, **11**, 399.
 — — preparation of, from the brine of salt meat, **17**, 406.
 Creatinine hydrochloride, preparation of, from urine, **24**, 942.
 Crenic acid in mineral waters, **24**, 921.
 Creosote. See Creasote.
 Cresol, action of liquid phosgene on, **24**, 342.
 Cresol of coal-tar, **24**, 531.
 Cresol, formation of, from toluene, **25**, 481.
 Cresyl chloride, **7**, 235.
 Cresyl hydrate (cresol), **7**, 233.
 Cresyl phosphate, **7**, 235.
 Cresylate of potassium, **7**, 236.
 Cresyl-naphthylamine, **24**, 1059; **25**, 1025.
 Cresyl-purpuric acid, **24**, 239.
 Cresylsulphurous acid, **24**, 828.
 Cresyl-xylidine, **25**, 1025.
 Crocus of antimony, **25**, 42.
 Cronstedtite, **24**, 9.
 Crops, annual yield of nitrogen per acre in different, **16**, 102.
 Crops, actual or possible sources of the nitrogen of, **16**, 107.
 Crops to which sewage is most applicable, **19**, 104.
 Crotonic acid obtained by oxidation of crotonic aldehyde, **25**, 618.
 Crotonic aldehyde, **25**, 616.
 Crotonic chloral, **25**, 495.
 — — the monochlorocrotonic acid obtained from, **25**, 689.

- Crotonic chloral, reaction of, with aqueous hydrocyanic acid, **25**, 485.
 Crotonic chloral hydrate, **24**, 557.
 Crotonitrile, **25**, 1021.
 Crotonylene chloride, **25**, 616.
 Croydon sewage. See Sewage.
 Crucible-cast steel, **25**, 1144.
 Cryptopine, **24**, 1065.
 Crystalline deposit, composition of the, from a solution of magnesium and ammonium chloride, **25**, 674.
 Crystalline dissociation, **25**, 600, 1068.
 Crystalline form of metallic chromium, **13**, 333.
 Crystalline form and circular polarisation, relation between, **13**, 264.
 Crystalline forms of alloys, **20**, 208.
 Crystalline forms of ductile metals, **13**, 334.
 Crystalline forms, Haüy's table of, compared with Leeson's system, III, 535.
 Crystalline phosphide of iron, **25**, 677.
 Crystalline substances, method of obtaining, in the dry way, and the application of this method to the production of artificial minerals, **1**, 181.
 Crystallisation of alum, **25**, 188.
 Crystallisations from borax, **24**, 804.
 Crystallisations from microcosmic salt, **24**, 803.
 Crystallised chloride of silver, **10**, 242.
 Crystallised iodide of silver, **10**, 243.
 Crystallised phosphate of lime, occurrence of deposits of, in human urine, **15**, 8.
 Crystallography, III, 486.
 Crystalloids, **15**, 217.
 Crystallonome, description of a, III, 499.
 Crystals, notation and classification of, III, 529.
 — polarising, produced by the action of iodine on the sulphate of quinine, **5**, 177.
 — preparation of, fully developed, **25**, 271.
 — synopsis of forms of, III, 536.
 Crystals of tin, **4**, 242.
 Cubebs, oil of, **17**, 9.
 Cudbear, substances contained in the lichens employed for the preparation of, **1**, 71.
 Coumarine. See Coumarin.
 Cumene, composition of, III, 444.
 Cumene, products of the oxidation of, by nitric acid, III, 441.
 Cumenyl peroxide, **17**, 273.
 Cumidic acid, **24**, 240.
 Cumidine, **1**, 2.
 Cumidine, composition of, **1**, 3.
 — products of the decomposition of, **1**, 9.
 — hydrochloride, **1**, 7.
 — platinum-salt of, **1**, 8.
 — sulphate, **1**, 6.
 Cumidine and toluidine, **1**, 7.
 Cuminamide, III, 406.
 Cuminate of methyl-salicyl, **1**, 61.
 Cumine acetate or acetic cuminate, **5**, 227.
 Cumine acid, passage of, through the animal system, **3**, 181.
 Cumine acid, anhydrous, **5**, 228.
 Cumine alcohol, **8**, 166.
 Cumine benzoate, or benzoic cuminate, **5**, 228.
 Cumine cuminate, or anhydrous cumine acid, **5**, 228.
 Cumosalicylamide, **6**, 196.
 Cumobenzosulphophenylamide, **6**, 196.
 Cumol. See Cumene.
 Cumonitrile, III, 408.
 Cumyl, **6**, 183.
 Cumylpiperidine, **6**, 178.
 Cupric aluminium sulphate, hydrated, **19**, 130.
 Cupric ethylcrotonate, **18**, 137.
 Cupric oxide, effect of, in facilitating the decomposition of potassium chlorate, **24**, 1152.
 Cupric oxychlorides and oxysulphates from Cornwall, on some hydrated, **18**, 77, 83.
 Cupric pyrophosphate, allotropic, **20**, 439.
 Cupric pyrophosphate, normal, **20**, 437.
 Cupric sulphate, action of, on normal urine, **25**, 1033.
 Cupric sulphate, reaction of, with potassium iodide, **24**, 581.
 Cupric sulphates, formation of basic, **24**, 1.
 Cupric valerate, normal, **24**, 1045.
 Cuprite, formation of, **24**, 206.
 Cuproplumbite from Chile, **14**, 160.
 Curarine, chemical detection of, **24**, 600.
 — use of phenol for detecting, **25**, 331.
 Curcumin, **24**, 152.
 Cutaneous irritation, influence of, on tissue change, **25**, 312.
 Cutch, analysis of, II, 47.
 Cuticular substance, **24**, 576.
 Cutting instruments, analysis of ancient, **4**, 273.
 Cyanacetic acid, electrolysis of, **24**, 701; **25**, 184.
 Cyanacetone, **24**, 921.
 Cyanate of allyl, **10**, 323.
 Cyanate of amyl, **3**, 95.

- Cyanate of ethyl, **3**, 90.
 Cyanate of ethyl, deportment of, with ethylate of sodium, **13**, 70.
 Cyanate of ethylene, action of nascent hydrogen on, **17**, 363.
 Cyanate of methyl, **3**, 91.
 Cyanate of potassium, isomeric, **2**, 391.
 Cyanate of potassium, preparation of, **1**, 97.
 Cyanate of thallium, **17**, 148.
 Cyanates, behaviour of triethylphosphine with, **13**, 322.
 — heat evolved in the formation of, **2**, 984.
 — physiological properties and metamorphoses of, in the organism, **25**, 256.
 Cyanates, aromatic, **2**, 138.
 Cyanbenzylamide and cyanbenzylamine, **25**, 1026.
 Cyanethine, homologue of, **2**, 397.
 Cyanic acid, action of, on chloral, **25**, 407.
 Cyanic ethers, decomposition of, **7**, 91.
 Cyanic ethers, new class of, **2**, 136.
 Cyanic and cyanuric ethers, compounds intermediate between, **2**, 392.
 Cyanic ethylanilide, **7**, 185.
 Cyanide of allyl, **25**, 1021.
 Cyanide of allyl-alcohol, **25**, 1092.
 Cyanide of carbonyl, preparation of, **25**, 148.
 Cyanide of ethylene, action of nitric and hydrochloric acids on, **15**, 137.
 — action of potash on, **15**, 136.
 — action of silver nitrate on, **15**, 137.
 — formation of, by electrolysis of cyanacetic acid, **25**, 485.
 — preparation of, **15**, 135.
 Cyanide of iron, copper and potassium, **15**, 357.
 Cyanide, mercuric, action of, on butyl iodide, **25**, 1092.
 Cyanide of gold, **11**, 80, 82, 86.
 Cyanide of gold and potassium, **11**, 88.
 Cyanide of phenyl, **7**, 242.
 Cyanide of potassium, **11**, 82, 92.
 — action of, on allyl iodide, **25**, 890.
 — action of, on dichloroacetic acid, **25**, 401.
 — as a reducing agent, **1**, 97.
 — as an agent of separation in quantitative analysis, **1**, 98.
 — preparation and applications of, **1**, 94.
 Cyanide of propylene, preparation, and conversion of, into pyrotartaric acid, **15**, 139.
 Cyanide, propylic, normal, **2**, 1032.
 Cyanide of silver, **11**, 92.
 Cyanide of thallium, **17**, 148.
 Cyanides, double, **2**, 389.
 Cyanides, double, decomposition of, by an electric current, **11**, 158.
 Cyaniline, action of acids and bases on, **2**, 300.
 — action of the alkalis on, **2**, 306.
 — action of bromine on, **2**, 306.
 — composition of, **1**, 161.
 — compounds of, **1**, 164—167.
 — preparation of, **1**, 160.
 — properties of, **1**, 163.
 Cyanmethine, **2**, 397.
 Cyanocumidine, **1**, 170.
 Cyanoforn, **2**, 901.
 Cyanoforn, action of nascent hydrogen on, **17**, 364.
 Cyanogen, absorption of, by charcoal under pressure, **2**, 79.
 — action of, on aniline, **2**, 142.
 — action of, on aniline, toluidine and cumiline, **1**, 159.
 — action of, on codeine, **4**, 119.
 — action of electric discharge on, **13**, 361.
 — action of, on melaniline, **1**, 308.
 — action of, on menaphthalamine, **9**, 12.
 — action of nascent hydrogen on, **17**, 363.
 — action of, on triphenyl-guanidine, **2**, 143.
 — decomposition of, by hydrochloric acid in alcoholic solution, **2**, 388.
 — deportment of diphtosamine with, **4**, 26.
 — electric spectra of metals in, **17**, 87.
 — estimation of, **11**, 125; **2**, 219.
 — its presence and action in the blast furnace, **22**, 215.
 — solvent power of liquid, **25**, 803.
 Cyanogen bromide, action of, on aniline, **1**, 311.
 Cyanogen chloride, action of, on the ammonia-bases, **7**, 184.
 — action of gaseous, on aniline, **1**, 285.
 — action of, on benzylic alcohol, **2**, 926.
 — action of, on toluidine, **3**, 154.
 Cyanogen chloride, bromide, and iodide, action of, on aniline, **1**, 285.
 Cyanogen iodide, action of, on aniline, **1**, 311.
 Cyanogen iodide in the iodine of commerce, **11**, 321.
 Cyanogen series, thermochemical researches in the, **2**, 982.

Cyanogen and iron, blue compounds of, III, 125.
 Cyanogen and titanium, chloride of, 3, 177.
 Cyanogen-compound of titanium, 3, 177.
 Cyanogen-derivatives of marsh-gas, 19, 352.
 Cyanopierin, 19, 352.
 Cyanotoluidine, 1, 170.
 Cyanotolylamine, 16, 196.
 Cyanurate of ethyl, 3, 90.
 Cyanurate of methyl, 3, 90.
 Cyanurate of potassium, acid, 1, 42.
 Cyanuric acid, reaction of, 24, 140.
 Cymene, action of nitric acid on, III, 425.
 — conversion of caoutchou into, 15, 119.
 — formation of, from cumic alcohol, 8, 168.
 — preparation of, III, 421.
 — from oil of turpentine, 25, 393.
 — from turpentine oil, and from lemon oil, 25, 1008.
 — from turpentine and caoutchou, conversion of, into insoluble acid, 15, 121.
 — production of, from hydrate of turpentine, 25, 240.
 Cymene derivatives, 25, 473.
 Cymenes, isomeric, 25, 439.
 Cymol. See Cymene.

D.

Daguerreotype plates, instrument for holding, in washing off, III, 318.
 Dahlia-inulin, 25, 68.
 Dambonite, 24, 811.
 Dandelion-root, analysis of the ash of, 9, 46.
 Daniell's battery, constant form of, 24, 102.
 Darwinite, 14, 161.
Datisea cannabina, 9, 226, 239.
 Datiseetine, preparation and properties of, 9, 229.
 — action of chromic acid on, 9, 233.
 Datiseetine and datiseine, analysis of, 9, 230.
 — action of nitric acid on, 9, 232.
 — action of potash on, 9, 233.
 Datiseine, action of dilute sulphuric acid on, 9, 228.
 — preparation and properties of, 9, 227.
 Datolite, 25, 995.

Davy-lamp, insecurity of, in inflammable mixtures of coal gas and air, 16, 402.
 Daylight, measurement of the chemical intensity of total, at Catania, during the total eclipse of December 22, 1870, 24, 1111.
 Dead cotton, 16, 8, 405.
 Decamalee gum of Scinde, 9, 238.
 Decatyl-compounds, 16, 428.
 Decenylene, 25, 436.
 Dechenite, 24, 502.
 Decoloration of flowers and leaves by electric discharges, 24, 883.
 Decomposition, chemical, heat disengaged in certain phenomena of, 6, 238.
 Decomposition, reciprocal, in alcohol, 15, 307.
 Decomposition, reciprocal, testimony of, from diffusion experiments, 15, 308.
 Decomposition, reciprocal, among salts in solution, 15, 302.
 Decomposition, spontaneous, of chloride of lime, 13, 84.
 Decompositions, catalytic, III, 348; 16, 337.
 Dee water, action of Clark's soap-test on, 4, 126.
 — composition of, 4, 125.
 — action of, on lead, 4, 129.
 Dehydration, and its importance to vegetable life and to fermentation, 24, 331.
 Delta of the Mississippi, geology of, 24, 675.
 Dendritic spots on paper, 25, 646.
 Densities of aqueous solutions, 25, 975.
 Densities of liquids, 24, 94.
 Densities of saline solutions, 24, 987.
 Densities of some solutions, 24, 1125.
 Densities of elements compared with those of their oxides, 24, 798.
 Density of a liquid in a closed space, method of determining the, 25, 383.
 Density of selenium in different states, 5, 90.
 Density and capillary action in saline solutions, a relation between, 25, 212.
 Deoxidation and oxidation effected by the alkaline peroxides, 16, 316.
 Deoxybenzoin, derivatives of, 24, 539.
 Deoxycodeine, 24, 404.
 Deoxyglutamic acid, 25, 815.
 Desclozite, 24, 502.
 Desmin, 24, 1016.
 Destructive distillation of animal substances, products of, 22, 406.
 Detonating compounds, theory of the explosion of, 25, 874.

- Detonating mixture of potassium nitrate and sodium acetate, **25**, 267.
- Detonating substances, explosive force of, **24**, 644.
- Detonation, mechanical effect of, in causing the explosion of gun-cotton, nitroglycerin, &c., **23**, 51-72.
- Deutazophosphate of ammonium, **3**, 360.
- Deutazophosphate of barium, **3**, 309; **17**, 233.
- Deutazophosphate of silver, **3**, 361.
- Deutazophosphate of zinc, **17**, 233.
- Deutazophosphoric acid, **3**, 304; **17**, 228, 231.
- Devitrification of glass, **25**, 387.
- Dextrin, **25**, 1000.
- behaviour of, to iodine and tannic acid, **25**, 72.
- dialysis of, **15**, 258.
- formation of, from starch, **25**, 580.
- occurrence of, in the lungs of the porpoise, **24**, 426.
- preparation of pure, **24**, 1099.
- Dextroglucose. See Dextrose.
- Dextronic acid, **25**, 486.
- Dextroracemates and levoracemates, **3**, 81.
- Dextroracemic acid, **3**, 81.
- Dextrose, compound of, with bromide of sodium, **16**, 297.
- formation of, by the action of acids on maltose, **25**, 588.
- Dextrotartaric and lævotartaric acids, mutual convertibility of, **25**, 1094.
- Diabetes, relation of the glycogenic function of the liver to, **25**, 901.
- Diacetate of ethylidene-glycol, trichlorinated, **25**, 247.
- Diacetodulcitol and diacetodulcitol, **25**, 400.
- Diacetoparatartaric acid, **20**, 154.
- Diacetoparatartaric anhydride, **20**, 150.
- Diacetoparatartaric ether, **20**, 147.
- Diacetosaccharose, reaction of, with sodium-saligenin, **25**, 70.
- Diaceto-saccharose, reaction of, with the lead-compounds of saligenin and rhamnetin, **25**, 71.
- Diacetotartaric acid, **20**, 151.
- Diacetotartarates, **20**, 152.
- Diacetyl-arabin, **25**, 68.
- Diacetyl-chloral hydrate, **25**, 247.
- Diacetyl-glucose, **25**, 69.
- Diacetyl-phenyl, **20**, 154.
- Diatomic power of gases and vapours, **17**, 73.
- Diatomic power of liquids, **17**, 71.
- Diatomic power of solids, **17**, 64.
- Diallyl, **25**, 436.
- Diallylamine, **10**, 326.
- Diallylene, **25**, 687.
- Dialyl-urea, **10**, 324.
- Dialuric acid, **11**, 11.
- Dialysed iron oxides, behaviour of, **25**, 270.
- Dialyser, cotton as a microscopic, **19**, 411, 413.
- Dialysers, **15**, 220, 239.
- Dialysis, **15**, 219, 237.
- Dialysis of organic colloidal substances, **15**, 256.
- Dialysis, preparation of colloidal substances by, **15**, 243.
- Dialysis through animal mucus, **15**, 243.
- Dialysis through parchment paper, **15**, 242, 243.
- Dialytic separation of gases by colloidal septa, **20**, 235.
- Diamagnetism of thallium, **17**, 125.
- Diamides, organo-metallic, **12**, 91.
- Diamides, primary, **12**, 78.
- Diamides, secondary, **12**, 80.
- Diamides, tertiary, **12**, 83.
- Diamidic acids, **12**, 105.
- Diamido-anthraquinone, **24**, 532.
- Diamidobenzoic acid, formation of, from nitro-amidobenzoic acid, **25**, 499.
- Diamidocarboxamido-phenylic acid, **25**, 713.
- Diamido-compounds, action of nitrous acid on, **20**, 91.
- Diamido-hydroxyl-anthraquinone, **24**, 534.
- Diamine-amidic acids, **12**, 104.
- Diamines, **11**, 261.
- Diammonio-zinc chloride, formation of, in Leclanché's manganese elements, **24**, 496.
- Diammonium-compounds, **11**, 271.
- Diamonds, occurrence of, in xanthophyllite, **24**, 667.
- Diamyl hydride, **16**, 428.
- Diamylamine, action of amyl bromide on, **4**, 323.
- Diamylamine, formation of, **4**, 322.
- Diamylamine hydrochloride, oxidation of, **21**, 162.
- Diamylamine salts, **4**, 323.
- Diamylaniline, **3**, 298.
- Diamylene, **25**, 1087.
- Diamylene, constitution of, **24**, 216; **25**, 434, 441.
- Diamylophenylamine, **3**, 298.
- Diamyloxalate, amylic, **22**, 56.
- Diamyloxalate, ethylic, **22**, 49.
- Diamyloxalic acid, **22**, 53.
- Dianisol, **24**, 123.
- Diaphorite, **24**, 665.
- Diapo, meaning of, as prefix, **25**, 652.
- Diapo-tetramorphine, action of hydriodic acid and phosphorus on, **25**, 656.
- Diapo-tetramorphine, action of hydrochloric acid on, **25**, 655.

- Diarsonium compounds, **14**, 338.
 Diastase in malt, distribution of, **25**, 1110.
 Diastase, action of, on starch, **25**, 380.
 Diazo-amido-anisic acid, products of decomposition of, **18**, 314.
 ——— salts of, **18**, 313.
 Diazo-amidobenzene, **19**, 57.
 ——— action of bromine on, **19**, 60.
 ——— action of nitrous acid on, **19**, 60.
 Diazo-amidobenzoates, **18**, 301.
 Diazo-amidobenzoic acid, **18**, 299.
 ——— action of ammonia on, **18**, 310.
 ——— action of chlorine, bromine, and iodine on, **18**, 306.
 ——— action of the haloïd acids on, **18**, 302.
 ——— action of hydriodic acid on, **18**, 305.
 ——— action of nitric acid on, **18**, 308.
 ——— action of nitrous acid on, in presence of alcohol, **18**, 310.
 ——— action of nitrous acid on, in presence of water, **18**, 309.
 ——— products of decomposition of, **18**, 302.
 ——— salts of, **18**, 300.
 Diazo-amidobromobenzene, **19**, 63; **20**, 71.
 Diazo-amido-chlorobenzene, **19**, 64.
 Diazo-amido-cuminic acid, **18**, 317.
 Diazo-amido-dibromobenzene, **19**, 65.
 Diazo-amido-dichlorobenzene, **19**, 66.
 Diazo-amido-nitranisol, **19**, 68.
 Diazo-amido-nitrobenzene, **19**, 64.
 Diazo-amido-toluates, **18**, 316.
 Diazo-amido-toluene, **19**, 67.
 Diazo-amido-toluic acid, **18**, 316.
 Diazol enzyme, **20**, 47.
 ——— compound of, with barium hydrate, **20**, 47.
 ——— compound of, with potassium hydrate, **20**, 46.
 ——— compound of, with silver hydrate, **20**, 47.
 ——— compounds of, with amido-acids, **20**, 50.
 ——— compounds of, with organic bases, **20**, 48.
 ——— compounds, deportment of, when boiled in aqueous solution, **20**, 53.
 ——— ethylated compounds of, attempt to prepare, **20**, 65.
 ——— imidogen compounds of, **20**, 52.
 Diazobenzene aurochloride, **20**, 45.
 ——— action of sulphuretted hydrogen on, **20**, 57.
 Diazobenzene hydrobromide, **20**, 43.
 Diazobenzene nitrate, **20**, 38.
 ——— action of alcohol on, **20**, 54.
 ——— action of alcoholic potash on, **20**, 62.
 ——— action of ammonia on aqueous, **20**, 63.
 ——— action of barium carbonate on, **20**, 59.
 ——— action of nitric acid on, **20**, 55.
 ——— action of potash on, **20**, 61.
 Diazobenzene perbromide, **20**, 44.
 ——— decomposition of, by heat, **20**, 64.
 Diazobenzene platinochloride, **20**, 44.
 ——— decomposition of, by heat, **20**, 64.
 Diazobenzene sulphate, **20**, 41.
 ——— action of sulphuric acid on, **20**, 55.
 Diazobenzene-amidobenzoic acid, **20**, 51.
 Diazobenzene-amidobromobenzene, **20**, 49.
 Diazobenzene-amidonaphthol, **20**, 50.
 Diazobenzol. See Diazobenzene.
 Diazobenzolimide, **20**, 52.
 ——— action of nascent hydrogen on, **20**, 59.
 Diazobromobenzene, **20**, 70.
 ——— compound of, with potassium hydrate, **20**, 69.
 ——— compound of, with silver hydrate, **20**, 70.
 ——— compounds of, with amido-compounds, **20**, 70.
 ——— compounds, decomposition of, **20**, 72.
 ——— imidogen-compounds of, **20**, 71.
 Diazobromobenzene aurochloride, **20**, 69.
 Diazobromobenzene hydrobromide, **20**, 67.
 Diazobromobenzene nitrate, **20**, 66.
 Diazobromobenzene perbromide, **20**, 68.
 Diazobromobenzene platinochloride, **20**, 69.
 Diazobromobenzene sulphate, **20**, 67.
 Diazobromobenzene-amidobenzoic acid, **20**, 71.
 Diazobromobenzol. See Diazobromobenzene.
 Diazobromobenzolimide, **20**, 71.
 Diazo-chlorobenzene-compounds, **20**, 76.
 Diazo-chlorobenzol. See Diazo-chlorobenzene.
 Diazo-compounds, behaviour of, to alkaline bisulphites, **24**, 1496.
 Diazodibromobenzene-compounds, **20**, 75.

- Diazodichlorobenzene-compounds, **20**, 77.
- Diazodinitrophenol, **18**, 268, 298.
- Diazodinitrophenol produced by the action of nitric acid on picramic acid, **21**, 151.
- Diazo-iodobenzene-compounds, **20**, 77.
- Diazonaphthalene-compounds, **20**, 88.
- Diazonaphthalene-compounds, observations on the products of decomposition of, **20**, 89.
- Diazonaphthol. See Diazonaphthalene.
- Diazonaphtholimide, **20**, 89.
- Diazonitransol-compounds, **20**, 87.
- β*-Diazonitrobenzene-compounds, **20**, 80.
- Diazonitrobenzene-compounds, products of decomposition of, **20**, 82.
- Diazonitrochlorophenol, **18**, 271.
- Diazonitrophenol, **18**, 270.
- Diazonitrophenol, decomposition of, hydrochloric acid, **25**, 15.
- Diazo-resorcin hydrochloride, **24**, 830.
- Diazo-resorufin, **24**, 830.
- Diazotoluolene-compounds, **20**, 86.
- Dibenzohydroxamic acid, **25**, 415.
- Dibenzophenylamide, **6**, 197.
- Dibenzo-sulphophenylamide, **6**, 196.
- Dibenzoylimide, a derivative of bitter-almond oil, **4**, 225.
- Dibenzylguanidine, **25**, 1027.
- Dibenzylloxamide, **25**, 1026.
- Dibenzylphosphine, **25**, 423.
- Dibenzyl-sulpho-urea, **25**, 1027.
- Dibenzyl-urea, **24**, 928; **25**, 448.
- Dibromacetic acid, formation of, in the manufacture of bromal, **25**, 559.
- Dibromamidobenzoic acid, **24**, 365.
- Dibromaniline, **25**, 304.
- composition of, **11**, 291.
- properties of, **11**, 295.
- Dibromanthracene, **24**, 15.
- action of sulphuric acid on, **24**, 19.
- Dibromanthraquinone, **23**, 136.
- Dibromide of coumarin, **23**, 369; **24**, 37.
- Dibromide of dibrominated ethylene, **14**, 206.
- Dibromide of ethylene, **13**, 67.
- — action of, on pyridine, **14**, 161.
- — action of, on triethylarsine, **14**, 336.
- — action of, on triethylphosphine, **14**, 76.
- — action of, on trimethylphosphine, **14**, 320.
- Dibromide of ethylene-dipyridyl-diammonium, **14**, 163.
- Dibromide of ethylene-hexethyl-diarsonium, **14**, 338.
- Dibromide of ethylene-hexethyl-diphosphonium, **14**, 89.
- Dibromide of ethylene-hexmethyl-diphosphonium, **14**, 323.
- Dibromide of ethylene-triethyl-arsammonium, **14**, 339.
- Dibromide of tribrominated ethylene, **14**, 208.
- Dibromisatin, action of fused potassium hydrate on, **11**, 294.
- Dibromobenzene, **24**, 119.
- Dibromobenzene, derivatives of the solid, **25**, 1003.
- Dibromobenzenes, isomeric, **25**, 303.
- Dibromobenzene-sulphonic acid, **25**, 76.
- Dibromobenzoic acid, **24**, 364.
- Dibromocaproic acid, formation of, by the action of bromine on hydrosorbic acid, **25**, 487.
- Dibromocoumarin (*α*), **24**, 39.
- Dibromocoumarin (*β*), **24**, 42.
- Dibromodiallyl, **25**, 687.
- Dibromodipyridine, **22**, 413.
- Dibromomelaniline, **1**, 299.
- Dibromomelaniline hydrochloride, **1**, 300.
- Dibromomelaniline platinumchloride, **1**, 301.
- Dibromonitrobenzoic acid, **24**, 364.
- Dibromonitrophenols, **25**, 861, 863.
- Dibromonitrosulphobenzene, **24**, 1056.
- Dibromophenolsulphonic acid, nitration-products of, **25**, 857.
- Dibromopropionic acid, **25**, 402.
- Dibromopseudocumene, **25**, 240.
- Dibromopyrene dibromide, **24**, 691.
- Dibromorthotolidine, **24**, 1062.
- Dibromothymoquinone, **24**, 351.
- Dibromotoluene, **25**, 698.
- Dibromotoluenes, isomeric, **24**, 686.
- Dibutyl, normal, **25**, 1086.
- Dibutylamine, **24**, 122, 523.
- Dibutylloxamide, **24**, 121.
- Dibutyraldine, **24**, 401.
- Dibutyraldine not identical with conhydrine, **25**, 417.
- Dibutylin and its principal compounds, researches on, **6**, 260, 286.
- Dicarbinols, **19**, 56.
- Dicarbon-acids, formation of, from monocarbon-acids, **17**, 109.
- Dicarbonate of copper, action of sodium carbonate on, **14**, 71.
- Dicarbonyl-platinous chloride, **24**, 1012.
- Dicarbopyridenic acid, **24**, 144.
- Dicarboxyl-sulphocarbonyl, **24**, 238.
- Dichloracetic acid, action of potassium cyanide on, **25**, 401.
- Dichloracetic acid, preparation of, **17**, 398.
- Dichloracetin, **24**, 907.
- Dichloracetone (so-called), **24**, 1027.
- Dichloraldehyde, action of phosphorus pentachloride on, **24**, 1190.
- Dichlorallylene, **24**, 557.

- Dichlorallylene, formation of, from tri-chloroacetic acid, **24**, 233.
 Dichloraniline, **11**, 285.
 Dichloranthracene, **24**, 14.
 Dichloranthracene, action of sulphuric acid on, **24**, 15.
 Dichloroethyl oxide, **24**, 513.
 Dichlorhydrin, **7**, 283; **25**, 612, 684, 999.
 — oxidation-products of, **24**, 1028.
 — preparation of, **24**, 908.
 Dichloride of benzylene: its action on triethylphosphine, **14**, 343.
 Dichloride of copper, diffusion of, **4**, 101.
 Dichloride of coumarin, **24**, 43.
 Dichloride of ethylene: its action on triethylphosphine, **14**, 316.
 Dichloride of ethylene-dipyridyl-diammonium, **14**, 163.
 Dichloride of ethylene-hexethyl-diphosphonium, **14**, 95.
 Dichloride of ethyl-sparteine, **15**, 7.
 Dichloride of sulphur, on the existence of, **24**, 1163.
 Dichloride of tolylene, derivatives of, **25**, 136.
 Dichloride of triethyl-benzylphosphonium, **14**, 343.
 Dichlorinated ethylene, action of light on, **25**, 891.
 Dichloriodhydrin, **24**, 907.
 Dichlorisatin, action of fused potassium hydrate on, **11**, 285.
 Dichloro-dibromopropylene, **24**, 558.
 Dichloroglycide, **25**, 685.
 Dichloromelаниline, **1**, 298.
 Dichloromononitrophenols, **24**, 251.
 Dichloronaphthalenes, α and β , **25**, 65.
 Dichloronaphthalene tetrachloride, **25**, 64.
 Dichloronaphthaquinone, formation of phthalic acid by oxidation of, **25**, 443.
 Dichlorophenolsulphonic acid from dichlorophenol, **25**, 16.
 Dichlorophenolsulphonic acid, nitration-products of, **25**, 93.
 Dichlorophenol-sulphonic acids, action of nitric acid on, **24**, 1112.
 Dichlorophthalic acid, **25**, 76.
 Dichloropiperonal, action of hot water on, **24**, 939.
 Dichloropiperonal chloride, **24**, 938.
 Dichroism of iodine-vapour, **24**, 993.
 Dichromates, alkaline, and gelatin, action of light on mixtures of, **24**, 304.
 Decodine, formation of, **25**, 506.
 — physiological action of, **25**, 509.
 Dicyanide of ethylene-hexethyl-diphosphonium, **14**, 98.
 Dicyanocodine, **4**, 119.
 Dicyanomelаниline, metamorphoses of, **2**, 301.
 Dicymenaphthalamine, **9**, 13.
 Didymium in British minerals, **25**, 1075.
 — in pyromorphite, **25**, 995.
 — determination of, in tantalites and columbites, **25**, 194.
 — metallic, **6**, 262.
 — optical test for, **10**, 219.
 — salts of, **6**, 262—272.
 — separation of, from cerium and lanthanum, **2**, 140.
 — separation of, from cerium, lanthanum, and yttrium, **24**, 494, 495.
 Didymium and ammonium sulphate, **6**, 270.
 Didymium and potassium sulphate, **6**, 272.
 Didymium and sodium sulphate, **6**, 271.
 Diet, animal or vegetable, influence of, on the composition of goat's urine, **25**, 838.
 Diet and exercise, effect of, on the elimination of nitrogen, **24**, 412.
 Diethacetone-carbonate, ethylic, **19**, 400.
 Diethoxalate, amylie, **22**, 54.
 Diethoxalate, ethylic, **22**, 30.
 Diethoxalate, ethylic, preparation of, **20**, 197.
 Diethoxalate ethylic, action of phosphorus tetrachloride on, **18**, 133.
 Diethoxalate, methylic, **22**, 40.
 Diethoxalate, zinc-monoethyl-ethylic, **22**, 32.
 Diethoxalates, metallic, **22**, 35.
 Diethoxalic acid, preparation of, **20**, 179.
 — quantitative analysis of, by limited oxidation, **20**, 179, 232.
 Diethoxyl-diethylsulphyl-pyrosulphophosphoric ether, **25**, 985.
 Diethyl glycollate, **24**, 908.
 Diethyl, stannic, action of bichloride of titanium on, **16**, 23.
 Diethyl, stannic, its action on metallic salts, **16**, 22.
 Diethyl-acetone, formation of, by the action of sodium on a mixture of phosgene, ether, and ethyl iodide, **25**, 607.
 Diethylamine, action of, on bromide of bromethyl-triethylphosphonium, **14**, 331.
 Diethylamine, formation of, **3**, 300.
 Diethylammonia, **3**, 300.
 Diethylamylamine, action of methyl iodide on, **4**, 316.
 Diethylamylamine, formation of, **4**, 315.
 Diethylamylamine, platinum-salt of, **4**, 315.

- Diethylaniline, **3**, 288.
 — action of ethyl bromide on, **3**, 289.
 — action of ethyl iodide of, **4**, 318.
 Diethylaniline hydrobromide, **3**, 288.
 Diethyl-diacetamide, **24**, 816.
 Diethyl-dioxybenzoic acid, **25**, 1015.
 Diethyl-dipyridine, **22**, 412.
 Diethylidene-lactamic acid, **25**, 77.
 Diethylin, **7**, 284.
 Diethyl-phenylamine, **3**, 288.
 Diethyl-phosphine, **24**, 569, 715.
 Diethyl-phosphinic acid, **25**, 422.
 Diethyl-protocatechuic acid, **24**, 830.
 Diethyl-pyrocatechin, **24**, 830.
 Diethyl-tartaric acid, **20**, 155.
 Diethyl-tartrate of acetyl, **20**, 155.
 Diethyl-toluidine, **7**, 72.
 Diffusion, effect of temperature on,
 15, 235.
 — of albumin, **15**, 224.
 — in alcohol of a solution of resin,
 15, 228.
 — of ammoniated salts of copper,
 3, 264.
 — of caramel, **15**, 224.
 — of a mixture of chloride of potas-
 sium and chloride of sodium, **15**,
 230.
 — of a mixture of chloride of potas-
 sium and sulphate of sodium, **15**, 234.
 — decomposition of salts by, **3**,
 268.
 — gaseous, **24**, 186.
 — of gases through brick and mortar
 walls, **10**, 256.
 — of gases through porous septa,
 force of, **25**, 594.
 — of gum, **15**, 222.
 — of hydrochloric acid, **15**, 227.
 — of iodine and acetate of potass-ium
 in alcohol, **15**, 228.
 — of liquids, **3**, 257—279; **4**, 83—
 104.
 — liquid, applied to analysis, **15**, 216.
 — liquid, application of, to produce
 decomposition, **3**, 60.
 — of mercurial vapours, **25**, 225.
 — of one salt into the solution of
 another salt, **3**, 269.
 — of potassium hydrate, **3**, 276.
 — separation of salts of different bases
 by, **3**, 266.
 — of sodium chloride, **3**, 276; **15**,
 222, 225, 227, 230, 231, 232, 234, 236.
 — of a mixture of sodium chloride
 and potassium sulphate, **15**, 234.
 — of mixtures of sodium chloride with
 the sulphates of sodium and potassium,
 15, 231, 232, 234.
 — of sodium salts, **3**, 277.
 — of sugar, **15**, 222, 226.
 — of tannin, **15**, 222.
 Diffusion of various salts and other sub-
 stances, **3**, 260.
 Diffusion-apparatus for extraction of
 plant-juices, especially of the sugar-
 beet and sugar-cane, **24**, 1100.
 Diffusion-experiments, testimony of re-
 ciprocal decomposition from, **15**, 308.
 Diffusion-process, Schultz's cold, **24**,
 1100.
 Diffusion-velocities of constituents of
 coal-gas, viz., bisulphide of carbon
 vapour, carbonic oxide, hydrogen,
 light carburetted hydrogen, and ole-
 fiant gas, **16**, 1000.
 Difluoride of ethylene-hexethyl-diphos-
 phonium, **14**, 98.
 Digallic acid and anhydride, **25**, 246.
 Digestion, artificial, of casein by pepsin,
 24, 731.
 Digestion of cellulose by pigs, **25**, 1036.
 Digestion, chemistry of, **15**, 407.
 Digestion of mineral substances by
 animals, **25**, 1107.
 Digitaline, action of crystallised, on the
 temperature of the body, and on
 diuresis, **25**, 836.
 Diglycerides, **12**, 243.
 Diglycollamic acid, **24**, 361.
 — — constitution of, **24**, 236,
 361.
 Dihydrate of boric dioxyethide, **15**,
 371.
 Dihydrate of ethylene-hexethyl-diphos-
 phonium, **14**, 92.
 Dihydrate of ethylene-hexethyl-phos-
 phorsonium, **14**, 333.
 Dihydro-tetrazo-resorutin nitrate, **24**,
 831.
 Di-iodate of ethylene-hexethyl-diphos-
 phonium, **14**, 99.
 Di-iodhydrin, **25**, 684.
 Di-iodide of ethylene: its action on
 triethylphosphine, **14**, 318.
 Di-iodide of ethylene-hexethyl-diphos-
 phonium, **14**, 95.
 Di-iodide of ethylene-hexethyl-diphos-
 phonium, compound of, with iodide of
 zinc, **14**, 102.
 Di-iodide of ethylene-hexamethyl-diphos-
 phonium, **14**, 324.
 Di-iodide of ethylene-tetreehyl-phos-
 phammonium, **14**, 330.
 Di-iodide of methylene, **13**, 65.
 Di-iodomelamine platinochloride, **1**, 304.
 Di-iodorscellinate of ethyl, **20**, 224.
 Di-iodorscellinate of methyl, **20**, 225.
 Dilactamic acid, **24**, 128.
 Dilactamic acid formed by the action of
 ammonia on ethyl chloropropionate,
 25, 1002.
 Dill carvol, **25**, 9.
 Dill oil, **17**, 9.

- Dill oil, anethene obtained from, **25**, 3.
 Dimethacetone-carbonate, ethylic, **19**, 412.
 Dimethoxalate ethylic, action of phosphorus trichloride on, **18**, 141.
 Dimethoxalic acid, oxidation of, **20**, 297.
 Dimethyl, action of chlorine on, **21**, 503.
 — preparation of, by electrolysis of an alkaline acetate, **21**, 502.
 — preparation of, by Frankland's process, **21**, 500.
 — preparation of, by Schützenberger's process, **21**, 497.
 — researches on, **21**, 496.
 Dimethylaniline and its homologues, formation of, **24**, 1061.
 Dimethylantracene, **25**, 1006.
 Dimethylated acetone, **19**, 414.
 Dimethyl-benzene, **24**, 509.
 Dimethyl-benzenes, **25**, 438.
 Dimethyl-norhemipinic acid, **21**, 362.
 Dimethyl-normecolin, **21**, 362.
 Dimethyl-noropianic acid, **21**, 362.
 Dimethyl-oxybenzoic acid, **24**, 704.
 Dimethyl-phosphine, **24**, 835.
 Dimethyl-phosphinic acid, **25**, 421.
 Dimethyl-protocatechuic acid, **24**, 829.
 Dimethyl-pseudopropyl carbinol, **24**, 1035.
 Dimethyl-toluidines, formation of, **25**, 1022.
 Dimethyl-xylydines, formation of, **25**, 1023.
 Dimorphism, **11**, 93.
 Dimorphism, heat disengaged in certain modifications by, **6**, 238.
 Dinaphthylamine, **25**, 1025.
 Dinas brick, Welsh, analysis of, **21**, 297.
 Dinas bricks, analysis of, **25**, 1016.
 Dinas-stone, manufacture of, **24**, 1099.
 Dinitraniline, **14**, 212.
 Dinitrate of ethylene-hexethyl-diphosphonium, **14**, 99.
 Dinitro-acetoluide, **24**, 681.
 Dinitro-acetonaphthylamide, **25**, 81.
 Dinitro-acridine, **24**, 711.
 Dinitro-amidosalicylic acid, **25**, 115.
 Dinitro-aniline, **24**, 712.
 Dinitro-anisic acid, formation of chrys-anisic acid from, **25**, 714.
 Dinitro-anthraccene, **24**, 222.
 Dinitro-anthraquinone, **24**, 532.
 Dinitrobenzene, **25**, 1002.
 — action of nascent hydrogen on, **9**, 1.
 — heat of combustion of, **24**, 871.
 — heat evolved in the formation of, **24**, 873.
 — ready liberation of hydrocyanic acid from, **25**, 633.
 — product of decomposition of, **11**, 111.
 Dinitrobromophenol, **25**, 861.
 Dinitrochlorophenate of silver, **20**, 434.
 Dinitrochlorophenetol, **24**, 245.
 Dinitrochlorophenic acid, **20**, 433.
 Dinitrochlorophenol, **25**, 13.
 Dinitrochlorophenol (m. p. 103°), **25**, 96.
 Dinitrochlorophenols, **24**, 244, 245, 247, 1113.
 Dinitrocymene, **8**, 169.
 Dinitrodibromhydrin, erythritic, **24**, 811.
 Dinitrodichlorhydrin, erythritic, **24**, 811.
 Dinitrodihydroxyl-anthraquinone, **24**, 535.
 — — heat of combustion of, **24**, 871.
 Dinitroethylates, **11**, 83—87.
 Dinitroethylic acid, preparation of, **11**, 85.
 Dinitroethylic acid, products of decomposition of, **11**, 87.
 Dinitromelaniline, **1**, 305.
 Dinitromelaniline hydrochloride, **1**, 307.
 Dinitromelaniline platinumchloride, **1**, 307.
 Dinitromethylates, **11**, 89.
 Dinitromethyl-hypogallic acid, **21**, 361.
 Dinitronaphthalene, **24**, 695; **25**, 699.
 — colouring matters derived from, **9**, 1.
 — heat of combustion of, **24**, 871.
 Dinitro-octylene, **17**, 157.
 Dinitro-oxybenzoic acid, **25**, 715.
 Dinitro-para-amidobenzoic (chrysanic) acid, **25**, 115.
 Dinitroparatoluidine, **24**, 683.
 Dinitrophenol, chlorination of, **25**, 13.
 Dinitrophenols, **25**, 241, 483.
 Dinitrophenylic acid, **20**, 54.
 Dinitropyrene, **24**, 690.
 Dinitrosalithol, **2**, 31.
 Dinitrotoluene, derivatives of, **24**, 680.
 — formation of, **18**, 320.
 — heat of combustion of, **24**, 871.
 Dinitrotoluic acid, **13**, 72.
 Dinonyl ketone, **24**, 360.
 Diolen, **6**, 285.
 Diorite, **24**, 112.
 Dioxanthraquinonic acid (alizarin), **23**, 139.
 Dioxide of hydrogen, reaction of, with hydrogen iodide, **20**, 476.
 Dioxide of nitrogen, action of electric discharge on, **13**, 361.
 Dioxybenzoic acid, **24**, 827, 828.
 — — derivatives of, **25**, 1014.
 Dioxyethide, boric, **15**, 370.
 Dioxythymoquinone, **24**, 353.
 Dipalmitin, **6**, 284.
 Diperechlorate of ethylene-hexethyl-diphosphonium, **14**, 99.

- Diphenine, **25**, 503.
 Diphenyl, **25**, 1005.
 Diphenyl ketone, synthesis of, **25**, 707.
 Diphenyl-allophanic ethers, **20**, 394.
 Diphenylamine, **25**, 417.
 — colouring matters derived from, **25**, 1046.
 — formation of, **25**, 136, 626.
 — formation of, by heating sodium phenolsulphate with excess of aniline, **25**, 146.
 Diphenyl-biuret, **24**, 395.
 Diphenyl-biuret, derivatives of, **24**, 1053.
 Diphenylene oxide, **24**, 123.
 Diphenylmethane, **24**, 508, 688.
 Diphenylsulphocarbamide, decomposition of, by nitrous acid, **24**, 267.
 Diphenyltartramide, oxidation of, **21**, 163.
 Diposphonium compounds, **14**, 89.
 Dipicrate of ethylene-hexethyl-diphosphonium, **14**, 100.
 Diphtosamine, behaviour of, with cyanogen, **4**, 26.
 Diphtosamine bichromate, **5**, 220.
 Diphtosammonium, series of double chlorides containing, **5**, 213—219.
 Diphtosammonium, platino-bisulphocyanide of, **7**, 39.
 Diplumbic oxide, specific gravity and atomic volume of, **111**, 83.
 Dipropyl, formation of, from acetone, **25**, 409.
 Dipropyl, normal, **25**, 1086.
 Dipropyl ketone (butyrene), **24**, 386.
 Diptyl, **21**, 61.
 Dipyrindine, composition of, **22**, 410.
 — derivatives of, **22**, 412.
 — light bases obtained in the preparation of, **22**, 415.
 — oily base obtained in the preparation of, **22**, 413.
 — preparation of, **22**, 407.
 — properties of, **22**, 409.
 — salts of, **22**, 411.
 "Discharge" process, recovery of tartaric and oxalic acids from the residues of the, **24**, 172.
 Disinfecting powders containing carbolic acid, application of, **24**, 1223.
 Disinfecting power of phenol, **25**, 904.
 Disinfecting process for stinking wounds, **24**, 769.
 Disinfection of cesspools and street-gutters, **24**, 971.
 Disodiumtartric ether, **20**, 155.
 Dispersion, anomalous, **24**, 884; **25**, 383.
 Dispersion of light in silver iodide, bromide, and chloride, **24**, 653.
 Dispersion in selenium, **25**, 26.
 Dispersion, spectroscopic phenomena produced by, **24**, 798.
 Dispoline, **16**, 377.
 Dissociation in aqueous solutions of ferric chloride, **24**, 662.
 Dissociation, theory of, **24**, 880.
 Dissociation, thermo-chemical researches on, **25**, 22.
 Dissociation, crystalline, **25**, 600, 1068.
 Dissociation-tension of ammonium carbonate, **24**, 1195.
 Distearin, **6**, 283.
 Distillation, destructive, of animal substances, products of, **5**, 50.
 Distillation, fractional, in carbonic acid gas, apparatus for, **13**, 121.
 Distillation, fractional, important improvement in the method of, **25**, 228.
 Distillation of mixtures of liquids insoluble the one in the other, phenomena observed in, **24**, 975.
 Distillation, simultaneous, of water and certain alcohols insoluble in water, **24**, 1029.
 Distillation of wood, **24**, 1101.
 — — volatile oils obtained in the, **3**, 183.
 Distribution, laws which regulate the, of a substance between two solvents, **25**, 783.
 Disulphanilate of barium, **9**, 260.
 Disulphanilate of silver, **9**, 261.
 Disulphanilic acid, **9**, 261.
 Disulphanisolic acid, **10**, 216.
 Disulphanthraquinonic acid, **23**, 138; **24**, 20.
 Disulphetholates, **9**, 251.
 Disulphetholic acid, **9**, 250, 252.
 Disulphide of carbon. See Carbon Bisulphide.
 Disulphide of ethyl, **24**, 904.
 Disulphide of palladium, **24**, 313.
 Disulphobenzoic acid, **24**, 828.
 Disulphobenzolate of barium, **7**, 255.
 Disulphobenzoic acid, **9**, 255.
 Disulphocoumarilic acid, **24**, 52.
 Disulphocyanate of ethylene-hexethyl-diphosphonium, **14**, 99.
 Disulphodibromanthracenic acid, **24**, 19.
 — — oxidation of, **24**, 20.
 Disulphodichloranthracenic acid, **24**, 16.
 — — fluorescence of, **24**, 22.
 — — oxidation of, **24**, 20.
 Disulphometholate of ammonia, examination of the mother-liquor of, **9**, 247.
 Disulphometholates, metallic, **9**, 245.
 Disulphometholic acid, **9**, 245.
 — — identity of, with methionie acid, **9**, 263.
 Disulphophenic acid, **10**, 218.

- Disulphophenyleneate of silver, **20**, 57.
 Disulphophenylenic acid, **20**, 56.
 Disulphophenylic acid, **24**, 1054.
 Disulphopropionic acid, **9**, 253.
 Disulphhydrate of ethylene-hexethyl-di-phosphonium, **14**, 95.
 Disulphydrazate of potassium, **24**, 307.
 Dithallous periodate, **25**, 988.
 Dithallous phosphate, **25**, 988.
 Dithionate of lead, crystalline form of, **24**, 1180.
 Dithionate of thallium, **25**, 987.
 Ditolyl, **24**, 510.
 Ditolyl-oxamide, **16**, 198.
 Ditolyl-succinyl-diamide, **16**, 195.
 Ditolyl-sulpho-urea, **16**, 192.
 Ditolyl-urea, **16**, 193.
 Di valerian, **6**, 285.
 Divanadyl monochloride, **21**, 348.
 Diri-divi, examination of, **1**, 140.
 Dixylidine, **25**, 1026.
 Dolomite and tachylite of the Sababurg in Hesse, **25**, 129.
 Dolomitic springs of the Franconian Jurassic formation, **25**, 59.
 Domeskite, **14**, 161.
 Don water, composition of, **4**, 123.
 ——— hardness of, **4**, 128.
 Double decomposition, thermochemical researches on compounds formed by, **25**, 973.
 Double salts, chemical action of water on, **11**, 46.
 Doubly refractive substance of striped muscular fibre, condition of the, **24**, 735.
 Draconyl, **11**, 357.
 Drainage, loss of plant-food in soils resulting from, **24**, 276.
 Drainage-water, composition of, from plots of land differently manured, **24**, 286, 291.
 Drawings, new method of reproducing, **25**, 856.
 Dredgings from the Gulf Stream, **24**, 319.
 Dressing, composition of a French, for calico, **24**, 969.
 Drinking waters, analysis of, by a titrated soap-solution, **25**, 862.
 Drinking waters, determination of the amount of organic matter in, by means of a standard solution of permanganate of potash, **16**, 62.
 Drought of 1870, effects of, on some of the experimental crops at Rothamsted, **24**, 130.
 Dry system of collecting manurial matter, **19**, 83.
 Drying of gases, **25**, 594.
 Drying oils, properties of, **25**, 183.
 Duckweed, ash of, **14**, 219.
 Ductile metals, crystalline forms of, **13**, 334.
 Dulcite, acetic ethers of, **25**, 400.
 Dulcite, artificial formation of, **24**, 810.
 Dulcite, compounds of, with hydracids, **25**, 399.
 Dung of poultry, examination of fresh and commercial, **25**, 643.
 Dust thrown out by Vesuvius in the eruption of April, 1872, **25**, 1081.
 Dutch liquid, new member of the series resulting from the action of chlorine upon, **1**, 79.
 Dwelling-houses, chemical tests respecting the atmosphere of, **10**, 251.
 Dwelling-rooms, distribution of carbonic acid in, **10**, 269.
 Dyeing alpaca with iodine-green, **25**, 188.
 Dyeing black and loading of silk, **24**, 971.
 Dyeing leather with coal-tar colours, **25**, 1046.
 Dyeing silk and wool with coal-tar colours, **14**, 250.
 Dyeing wool amaranth-colour with fuchsine, **24**, 971.
 Dyes, yellow vegetable, certain relations of, **13**, 327.
 Dyes and dye-stuffs other than aniline, **25**, 1144.
 Dye-stuffs, preparation of, from anthracene, **24**, 1222.
 Dynamical theory of gases, elementary deduction of the fundamental equation of the, **24**, 881.
 Dynamics, chemical, a law in, **24**, 1123.
 Dynamite, explosive force of, **24**, 648.
 Dynamite, use of, for blasting, **25**, 1144.
 Dynamite, use of, for breaking up large castings, **24**, 772.
 Dynamite and its use in war, **24**, 771.
 Dynamites, various, **24**, 769.
 Dyslite, **25**, 100.

E.

- Earth-ball from a horse, **24**, 425.
 Earth-closet manure, composition and agricultural value of, **25**, 523.
 Earth-nut oil, detection and estimation of, in olive oil, **25**, 180.
 Earth-nut oil, hypogaeic acid obtained from, **8**, 279.
 Earths, alkaline, in vegetable ash, **11**, 187.
 Earths, vaporization of, in the blast-furnace, **22**, 231.

Earthy phosphates. See Phosphates.
 East Indian grass oil, **11**, 122.
 East London water, analysis of, **4**, 378.
Eau de Labarraque as a substitute for chloride of lime in discharging Turkey red, **24**, 172.
 Ebullition, effect of air in facilitating, **22**, 128, 143, 147, 151.
 Ebullition, effect of greasy films on the rate of, **22**, 128, 143, 145.
 Eddoes, analysis of the ashes of the, **3**, 193.
 Efflorescence, peculiar, of the chloride of potassium, **8**, 30.
 Efflorescences from Lago d'Ansanto, analysis of, **24**, 1177.
 Egg, nuclear structures in the yolk of the hen's, **24**, 746.
 Egg-albumin, **24**, 572.
 Egg-albumin, quantitative estimation of, **25**, 844.
 Eggs, preservation of, **24**, 866.
 Eichenmanna, **25**, 813.
 Eight-carbon ether, **6**, 314.
 Elder oil, **17**, 9.
 ——— sambucene obtained from, **25**, 3.
 Elecampane-inulin, **25**, 69.
 Electric condition of a gas-flame, **25**, 976.
 Electric conducting power of metallic sulphides and oxides, **24**, 302.
 Electric conduction by liquids without electrolysis, **25**, 209.
 Electric conductivity of thallium, **17**, 125.
 Electric current, decomposition of the double cyanides by, **11**, 158.
 ——— decomposition of metallic salts by, **11**, 255.
 ——— quantities of heat evolved in chemical actions produced by the, **6**, 260.
 Electric discharge, action of, on oxygen and other gases, **13**, 344.
 ——— apparatus for submitting gases and vapours to the, **25**, 970.
 ——— chemical effects produced by the heat of, **25**, 211.
 ——— decoloration of leaves and flowers by, **24**, 883.
 ——— decomposition of carbon dioxide under the influence of the, **25**, 667.
 ——— transport of salts by, **24**, 882.
 Electric incandescence, decomposition of gaseous compounds by, **12**, 273.
 Electric phenomena exhibited by certain metals when rubbed with carbon bisulphide, **25**, 971.
 Electric resistance in conductors, increase of, with rise of temperature, and measurement of, **24**, 478.

Electric spark, photographic effects of metallic and other spectra produced by means of the, **17**, 59.
 Electric sparks, decomposition of phosphoretted hydrogen by, **24**, 306.
 Electric spectra of alloys, **17**, 82.
 Electric spectrum of silver, relative absorptive action of various media on the, **17**, 76.
 Electric spectrum of thallium, **17**, 81, 134.
 Electricity, action of, on the coloured tissues of plants, **24**, 796.
 ——— conduction of, through liquids, **25**, 207.
 ——— decoloration of flowers by, **25**, 262.
 ——— influence exerted by, on the luminosity of phosphorus, **11**, 104.
 ——— new mode of obtaining, from mechanical force, **24**, 101.
 ——— oxidising power of oxygen when disengaged by means of voltaic, **11**, 285.
 Electricity, frictional, experiments on the explosion of gunpowder by, **14**, 174.
 Electricity from different sources, researches on the application of, to the explosion of gunpowder, **14**, 165.
 Electricity or magnetism, influence of, on circular polarisation, **13**, 261.
 Electrification of air and oxygen for the production of ozone, **24**, 994.
 Electro-chemical action, actinic influence of, **11**, 319.
 Electro-deposited antimony, properties of, **16**, 365.
 Electro-deposition of copper and brass, solution for, **24**, 103.
 Electrolysis, **25**, 207.
 ——— application of, to the detection of poisonous metals in mixtures containing organic matters, **13**, 12.
 ——— detection of antimony by, **13**, 20.
 ——— detection of arsenic by, **13**, 14, 338.
 ——— determination of copper and other metals by, **25**, 925.
 ——— law of, **6**, 47.
 ——— peroxides obtained by, **24**, 306.
 ——— preparation of pure zinc by, **25**, 221.
 ——— theory of, **11**, 47.
 ——— thermic researches on, **25**, 111.
 Electrolysis of acetic acid, **21**, 195.
 Electrolysis of alkaline acetates, preparation of dimethyl by, **21**, 502.
 Electrolysis of alkaline bases and sulphates, thermic researches on, **24**, 985; **25**, 110.

- Electrolysis of the hydracids, thermal effects produced during the, **25**, 25.
- of aqueous hydrosulphuric acid, **24**, 186.
- of itaconic acid, **25**, 144.
- of organic compounds, **2**, 157.
- of phthalic acid, **24**, 917.
- of potassium acetate, **24**, 916.
- of potassium isethionate, **24**, 186.
- of aqueous potassium sulphide, **24**, 186.
- of potassium sulphobenzoate, **24**, 186.
- of sodium ethyl-mercaptan, **24**, 186.
- of sodium phenyl-mercaptan, **24**, 186.
- of the substitution-derivatives of acetic acid, **24**, 701; **25**, 484.
- of sugar solutions, **25**, 578.
- of sulphuric acid, occurrence of ozone and peroxide of hydrogen in the, **7**, 251.
- Electrolytes, unequal decomposition of, **III**, 47.
- Electrolytic action, curious instance of, **16**, 235.
- Electro-magnetic induction apparatus, experiments on the explosion of gun-powder by, **14**, 168.
- Electromotive force on contact of different metals, **24**, 99.
- — in the contact of metals, and modification of that force by heat, **25**, 379.
- — developed by the contact of metals and inactive liquids, **25**, 662.
- — of induction in liquid conductors, **24**, 651.
- Electromotive power of metallic sulphides, **24**, 652.
- Electromotive and electrolytic phenomena developed by gold and platinum in solutions of alkaline and hydric sulphides, **24**, 481.
- Electroplating the interior of metallic pipes, **24**, 867.
- Electroprecipitated metals, structure of, **II**, 300.
- Electrostatic induction and decomposition of water, relation between, **24**, 101.
- Electrothermic methods of analysis and synthesis, **24**, 155.
- Electrotype, **25**, 1133.
- Elements, atomic heat of, **19**, 209.
- atomic weights of, **15**, 390.
- meaning of atomicity of, **25**, 378.
- classification of, in relation to their atomicities, **17**, 211.
- condition of certain, at the moment of chemical change, **4**, 194.
- Elements, density of, compared with that of their oxides, **24**, 798.
- equivalent values of, **22**, 200.
- considerations on the nature of the, **19**, 230.
- nomenclature and notation for expressing the different states of condensation of, **19**, 16.
- refraction-equivalents of, **23**, 109.
- in solution, ultimate disposition of, independent of original mode of combination, **15**, 302.
- specific heat of, **19**, 195.
- relation of the spectral properties of, to their physiological properties, **24**, 1078.
- considerations on the system of the, **24**, 483.
- non-metallic, volumes of, **III**, 92.
- non-metallic, and their oxides, **III**, 91.
- Ellagic acid, constitution of, **25**, 1098.
- Embrithite from Nertschinsk, composition of, **24**, 671.
- Emeraldine, **14**, 241.
- Emodin, **10**, 304.
- Emulsin, dialysis of, **15**, 261.
- Emulsifying of fat by the pancreatic juice, **15**, 415.
- of fatty acids by the bile, **15**, 415.
- of fatty acids by tribasic phosphate of soda, **15**, 415.
- Emulsions, formation of, accompanied by partial saponification, **15**, 415.
- Enamel for copper cooking vessels, **25**, 880.
- Encke's comet, spectrum of, **25**, 383.
- Endosmose, electrical, **III**, 28.
- Endosmose, influence of pressure on, **25**, 974.
- Energy, actual, developed by 1 gram of various articles of food when burnt in oxygen, **21**, 49.
- — developed by 1 gram of various articles of food when oxidised in the body, **21**, 49.
- Energy, voltaic, thermic researches on, **24**, 1134, 1136.
- Emeanchlorodinaphthalene, **25**, 65.
- Eosite, **24**, 500.
- Epichlorhydrin, action of sulphuric acid on, **24**, 125.
- Epilote, composition of, **24**, 1172.
- Epidote from Iona, **24**, 5.
- Epoxypheylhydrin, **24**, 1040.
- Equations, chemical, construction of, from the data afforded by experiment, **21**, 492.
- Equations, fundamental chemical, **21**, 392.
- Equivalence and atomicity, **22**, 202.
- Equivalent weights, **22**, 331.

- Equivalents of the phosphorus family of elements, division by three of the, **1**, 44 (p).
- Erbium, determination of, in tantalites and columbites, **25**, 194.
- Ergot-of-rye, chemical composition of, **24**, 724, 726.
- — — — — poisonous principle of, **25**, 1102.
- Eriaceous plants, some constituents of, **25**, 9C9.
- Eriuite, **19**, 135.
- Ersbyite from Pargas, **25**, 291.
- Erucic acid, action of fused potash on, **24**, 703.
- Erythric acid, III, 148.
- Erythrin, preparation of, from *Rochella fuciformis*, **20**, 222.
- Erythrite, compounds of, **24**, 811.
- Erythromannite, action of hydriodic acid on, **15**, 461.
- Erythrozym, **12**, 212.
- Eserine, blue colouring matter obtained from, **24**, 719.
- Eserine, preparation of neutral sulphate of, **25**, 82.
- Essential-oils, **17**, 1, 17 ; **24**, 1099.
- — — — — See also Oils, Volatile.
- Ethacetic acid, **19**, 408.
- Ethacetone-carbonate, ethylic, **19**, 404.
- Ethal, analyses of, **1**, 44.
- Ether, acetic, action of potassium sulphhydrate on, **17**, 418.
- — — — — action of sodium and amyl iodide upon, **19**, 418.
- — — — — action of sodium and ethyl iodide on, **19**, 396.
- — — — — action of sodium and methyl iodide upon, **19**, 411.
- — — — — analysis of, by limited oxidation, **20**, 233.
- — — — — constitution and chemical relations of the ethereal salts and ketones derived from the duplication of the molecule of, **19**, 419.
- — — — — examination of the products depending upon the duplication of the molecule of, **19**, 399.
- — — — — examination of the products derived from the substitution of ethyl for hydrogen in the methyl of, **19**, 406.
- Ether, acetobenzotartaric, **20**, 145.
- — — acetoparatartaric, **20**, 148.
- — — acetotartaric, **20**, 146.
- — — benzotartaric, action of alcoholic potash on, **20**, 141.
- — — benzotartaric, action of chloride of acetyl on, **20**, 144.
- — — bichloruretted salicylic, **3**, 78.
- — — binitrosalicylic, **3**, 78.
- — — borie, tribasic, III, 248.
- Ether, butylic, **8**, 268.
- — — butyric, analysis of, by limited oxidation, **20**, 230.
- — — capric, **4**, 334.
- — — carbanilic, **21**, 192.
- — — carbonic, action of dry sodium ethylate on, **22**, 442.
- — — — — formation of, **22**, 441.
- — — chloranilic, **23**, 8.
- — — chrysammic, **19**, 324.
- — — chrysanic, **3**, 78.
- — — common. See Ethyl Oxide.
- — — cyanacetic, **17**, 110.
- — — diacetoparatartaric, **20**, 148.
- — — diacetotartaric, **20**, 147.
- — — diethacetic, **19**, 409.
- — — diethoxyl-diethylsulphyl-pyrosulphophosphoric, **25**, 985.
- — — dimethacetic, **19**, 417.
- — — dimethylene-carbon-ethylene-sodic, **19**, 404.
- — — dinitroethylic, **11**, 86.
- — — disoacetic, **19**, 409.
- — — ethacetic, **19**, 407.
- — — ethyl-hexylic, **19**, 357.
- — — ethylic. See Ethyl Oxide.
- — — ethyltrithionic, **10**, 63.
- — — ethyl-tartaric, **20**, 155.
- — — formic, physiological action of, **25**, 638.
- — — hypogaeic, **8**, 281.
- — — methylodithionic, **10**, 249.
- — — oxalic, action of dry potassium ethylate on, **22**, 445.
- — — oxalic, action of sodium and potassium on, **22**, 441.
- — — paratartaric, action of chloride of acetyl on, **20**, 145.
- — — perchloric, note on, **15**, 213.
- — — picric, **19**, 235.
- — — pyrophosphodiamic, **19**, 296.
- — — pyrosulphophosphoric, **25**, 985.
- — — salicylic, action of barium hydrate on, **2**, 28.
- — — salicylic, derivatives of, **3**, 78.
- — — sebacic, action of ammonia on, **4**, 334.
- — — seven-carbon, **4**, 233.
- — — silicic, reduction-products of, **25**, 806.
- — — six-carbon, **4**, 234.
- — — sodacetic, **19**, 407.
- — — styphnic, or oxyptic, **19**, 236.
- — — succinotartaric, **20**, 144.
- — — sulphuretted acetic, **7**, 190.
- — — tartaric, action of chloride of acetyl on, **20**, 145.
- — — — — action of chloride of succinyl on, **20**, 143.
- — — — — action of sodium on, **20**, 154.
- — — three-carbon, **4**, 232.
- — — tribasic acetic, **24**, 515.

- Ether, tricarballylic, **18**, 335.
 — vinobutylic, **8**, 269.
- Ether-derivatives of polyatomic alcohols and acids, **2-4**, 820.
- Etheric normal lactic acids, **22**, 63.
- Etheric secondary lactic acids, **22**, 65.
- Etherification, **4**, 106, 229.
 — curious example of, **17**, 367.
 — observations on, **3**, 24.
- Etherogel of silicic acid, **17**, 322.
- Ethers, analysis of, **25**, 1120.
 — capillary transpiration of, **15**, 439.
 — synthetical researches on, by E. Frankland and B. F. Duppa. No. 1, synthesis of ethers from acetic ether, **19**, 395. No. 2, action of sodium and isopropyl iodide upon ethylic acetate, **20**, 102.
- Ethers, allylic, **10**, 319.
 — of arsenic and arsenious acids, **2-4**, 817.
 — carboketonic, **19**, 422.
 — compound, estimation of, in wine, **20**, 493.
 — — formation of, **17**, 47.
 — — heat disengaged in combustion of, **6**, 237.
 — — latent heat of, **1**, 35.
 — — titration of, **20**, 170.
- Ethers, cyanic, new class of, **2-4**, 136.
 — — decomposition of, **7**, 91.
- Ethers, diphenylallophanic, **2-4**, 394.
 — isodicyanic, **2-4**, 392.
 — isomeric, of the formula $C_nH_{2n}O_2$, boiling-points of, **18**, 30.
 — nitric, their action on acetic acid, **22**, 188.
 — nitric, action of, on valerianic acid in presence of sulphuric acid, **22**, 190.
 — nitrous and nitric, their decompositions and reactions, **20**, 576.
 — — action of zinc ethyl on, **21**, 174.
- Ethers intermediate between the cyanthylic and the methylic, ethylic, and amylic series, **6**, 307.
- Ethers, tartaric and paratartaric, action of benzoyl chloride on, **20**, 138.
- Ethers and alcohols, constitution of, **3**, 45.
- Ethers and alcohols, heat disengaged in combustion of, **6**, 236.
- Ethers and anhydrides, reaction for the production of, **18**, 21.
- Ethers, water and acids, critical observations on Williamson's theory of, **7**, 111.
- Ethide, ammonia-boric, **15**, 369.
 — boric, **15**, 367.
 — mercuric, action of various metals on, **17**, 35.
 — mercuric, action of zinc upon, **17**, 31.
- Ethomethoxalate ethylic, action of phosphorus trichloride on, **18**, 739.
- Ethomethoxalic acid, **22**, 45.
 — — oxidation of, **20**, 297.
- Ethyl, isolation of, **2**, 263.
- Ethyl acetate, action of sodium and isopropyl iodide on, **20**, 102.
 — — oxidation of, **19**, 484.
- Ethyl acetone-carbonate, **19**, 421.
- Ethyl acetoxybenzamate, **13**, 241.
- Ethyl acetyloxamate, **25**, 1091.
- Ethyl alcohol. See Alcohol Ethylic.
- Ethyl amylate, **4**, 233.
- Ethyl amylethoxalate, **22**, 48.
- Ethyl amylhydroxalate, **22**, 47.
- Ethyl anchoate, **10**, 173.
- Ethyl arsenate, **2-4**, 817.
- Ethyl arsenides, or arsenethyls, **7**, 258.
- Ethyl arsenite, **2-4**, 818.
- Ethyl benzoate, oxidation of, **20**, 131.
- Ethyl bibromacetate, **11**, 29.
- Ethyl biniodacetate, **13**, 5.
- Ethyl binitrobenzoate, **9**, 270.
- Ethyl bioxysulphocarbonate, **3**, 84.
- Ethyl bisulphide, preparation of, **3**, 19.
- Ethyl borate, action of zinc-ethyl on, **15**, 367.
 — — action of zinc-methyl on, **15**, 375.
- Ethyl bromacetate, **11**, 25.
- Ethyl bromide, action of, on ammonia, **3**, 299.
 — — action of, on amylaniline, **3**, 299.
 — — action of, on aniline, **3**, 284.
 — — action of, on bromaniline, **3**, 292.
 — — action of, on chloraniline, **3**, 290.
 — — action of, on diethylaniline, **3**, 289.
 — — action of, on ethylaniline, **3**, 287.
 — — action of, on ethylchloraniline, **3**, 291.
 — — action of, on nitraniline, **3**, 292.
- Ethyl bromide and iodide, action of, on triethylamine, **4**, 304.
- Ethyl caprate, **2-4**, 360.
- Ethyl chloracetate, action of potassium nitrite on, **25**, 608.
- Ethyl chloride, action of, on ammonia, **13**, 331.
 — — action of chlorine on, **2-4**, 696.
 — — chlorine-derivatives from, **2-4**, 512.
 — — chlorine substitution-products from, **25**, 394.
 — — monochlorinated, **2-4**, 923.
- Ethyl chloropropionate, formation of, **18**, 146.

Ethyl chlorosulphate, **10**, 101.
 Ethyl cyanate, **3**, 90.
 ——— behaviour of, with ethylate of sodium, **13**, 70.
 ——— behaviour of, with triethyl-phosphine, **13**, 322.
 Ethyl cyanide, products of the action of potassium on, **1**, 60.
 Ethyl cyanurate, **3**, 90.
 Ethyl diamyloxalate, **22**, 49.
 Ethyl diazo-amidoanisate, **18**, 314.
 Ethyl diazo-amidobenzoate, **18**, 301.
 Ethyl diazobromobenzolimid, **20**, 72.
 Ethyl diethacetonecarbonate, **19**, 400.
 Ethyl diethoxalate, **22**, 30.
 ——— action of phosphorus terechloride on, **18**, 138.
 ——— preparation of, **20**, 177.
 Ethyl diiodorsellinate, **20**, 224.
 Ethyl dimethacetone-carbonate, **19**, 412.
 Ethyl dimethoxalate, **18**, 141; **22**, 39.
 Ethyl diphenylallophanate, **24**, 394.
 Ethyl ethacetone-carbonate, **19**, 404.
 Ethyl ethomethoxalate, **18**, 139; **22**, 45.
 Ethyl ethyl-amylhydroxalate, **22**, 48.
 Ethyl ethylcrotonate, formation and properties of, **18**, 134.
 Ethyl ethylacetate, action of ammonia on, at high temperatures, **24**, 816.
 Ethyl formate, preparation of, **21**, 479, 483.
 ——— vapour-tension of, **21**, 481, 487.
 Ethyl gallate, **24**, 821.
 Ethyl glycerate, **24**, 908.
 Ethyl hydride, in American petroleum, **18**, 56.
 ——— identity of, with methyl, **17**, 262.
 Ethyl hydropiperate, **15**, 23.
 Ethyl iodide: absorption of its vapour by charcoal, **21**, 188.
 ——— action of, on codeine, **6**, 134.
 ——— action of a current of moist air on, **24**, 197.
 ——— action of, on diethylaniline, **4**, 318.
 ——— action of, on ethylamylaniline, **4**, 319.
 ——— action of, on ethyl-sparteine, **15**, 7.
 ——— action of, on morphine, **6**, 126.
 ——— action of phosphine on, **14**, 569.
 ——— action of, on potassium alcohol, **4**, 106.
 ——— action of solar light on, **3**, 322.
 ——— action of sodium amalgam on, in presence of acetic ether, **16**, 418.

Ethyl iodide, action of, on sparteine, **15**, 5.
 ——— action of tin on, **6**, 58.
 ——— action of, on toluidine, **7**, 68.
 ——— action of, on tyrosine, **22**, 291.
 ——— action of zinc on, **2**, 265.
 ——— action of zinc on, in presence of water, **2**, 288.
 ——— oxidation of, **19**, 486.
 ——— preparation of, **13**, 69.
 Ethyl iodide and alcohol, action of zinc on, **2**, 291.
 Ethyl iodide and amyl oxalate, action of zinc upon a mixture of, **22**, 54.
 Ethyl iodide and methyl oxalate, action of zinc on a mixture of, **22**, 40.
 Ethyl iodide and phosgene-ether, action of sodium on, **25**, 607.
 Ethyl iodide and sodium, action of, upon acetic ether, **19**, 396.
 Ethyl iodide and water, simultaneous distillation of, **25**, 239.
 Ethyl isopropacetate, **20**, 109.
 ——— isopropacetone-carbonate, **20**, 104.
 Ethyl lactate, action of phosphorus terechloride on, **18**, 144.
 Ethyl leucate, action of phosphorus terechloride on, **18**, 133.
 Ethyl methacetone-carbonate, **19**, 415.
 Ethyl methacrylate, formation and properties of, **18**, 142.
 Ethyl methylate, **4**, 232.
 Ethyl methylcrotonate, **18**, 139.
 Ethyl methyldithionate, **10**, 249.
 Ethyl nitrate, **20**, 584.
 ——— heat evolved in the formation of, **24**, 872.
 ——— oxidation of, **19**, 486.
 ——— vapour-density of, **15**, 153.
 ——— action of glacial acetic acid on, in presence of sulphuric acid, **22**, 189.
 Ethyl nitrite, action of sulphurous acid on, **23**, 417.
 Ethyl nitrotoluylate, III, 434.
 Ethyl oxalate, action of sodium amalgam on an alcoholic solution of, **25**, 365.
 ——— action of sodium and potassium on, **22**, 441.
 ——— action of zinc-ethyl upon, **22**, 29.
 Ethyl oxide: absorption of its vapour by charcoal, **18**, 289.
 ——— action of, on iodides, **25**, 923.
 ——— action of sodium upon iodide of methyl mixed with, **13**, 140.
 ——— action of sulphuric acid on, at high temperatures, **25**, 695.

- Ethyl oxide, action of zinc and ethyl iodide on, **2**, 293.
- — — — — chloro-substitution products of, **24**, 513.
- — — — — formation of, by double decomposition, **4**, 230.
- — — — — formation of, by heating a mixture of rosaniline, ethyl iodide and alcohol, **17**, 367.
- — — — — peculiar property of, **4**, 133.
- — — — — solubility of gallotannic acid in, **13**, 325.
- — — — — vapour-density of, **15**, 147.
- Ethyl plumbides or Plumbethyls, **7**, 268.
- Ethyl propacetate, **20**, 109.
- Ethyl selenide or Selenethyl, **7**, 93.
- Ethyl sulphate, neutral, and its products of decomposition with water, **1**, 397.
- Ethyl sulphides, **24**, 904.
- Ethyl sulphides and their derivatives, action of chlorine on, **13**, 45.
- Ethyl sulphocyanate, **21**, 193.
- — — — — preparation of, **1**, 46.
- — — — — and bisulphide, hyposulph-ethylie and bisulphethylie acids produced by the action of nitric acid on, **1**, 45.
- Ethyl, tetrabasic carbonate or ortho-carbonate of, **17**, 298.
- Ethyl thiacetate, **7**, 190.
- Ethyl tolylate, **14**, 430.
- Ethyl trinitro-oreinate, **24**, 358.
- Ethyl valerate, action of sodium on; liberation of the acid-forming radical, valeryl, **17**, 371.
- Ethyl zinc-monethyl-diethoxalate, **22**, 32.
- Ethyl and ethylene, behaviour of tri-ethyl phosphine with the sulphocyanates of, **13**, 318.
- Ethyl and hydrogen, compounds obtained by the action of anhydrous sulphuric acid on the chlorides of, **10**, 97.
- Ethyl and methyl iodides, and ethyl oxalate, action of zinc upon a mixture of, **22**, 43.
- Ethyl, a-etylinated, salts of, **23**, 14.
- Ethyl, mercuric, action of bichloride of tin on, **16**, 21.
- Ethyl, mercuric, action of chloride of cadmium on, **16**, 21.
- Ethyl, mercuric, action of sodium on, **16**, 20.
- Ethylacetamide, formation of, **7**, 92.
- Ethyl-allyl-urea, **10**, 323.
- Ethylamine, **3**, 96, 299.
- — — — — absorption of its vapour by charcoal, **21**, 188.
- — — — — its action on bromide of bromethyl-triethyl-phosphonium, **14**, 328.
- Ethylamine, formation of, **3**, 92; **8**, 161.
- — — — — oxidation of, **19**, 328.
- — — — — preparation and properties of, **3**, 94.
- Ethylamine chloroplatinate, **3**, 95.
- Ethylamine hydrochloride, **3**, 95.
- Ethylammonia, **3**, 299.
- Ethylamyl, action of chlorine on, **16**, 426.
- Ethylamylamine, oxidation of, **19**, 489.
- Ethylamylaniline, action of methyl iodide on, **3**, 19.
- Ethylamylphenamine, **3**, 96.
- Ethylanilide, cyanic, **7**, 185.
- Ethylaniline, **3**, 285.
- — — — — action of amyl bromide on, **3**, 299.
- — — — — action of ethyl bromide on, **3**, 287.
- — — — — action of methyl iodide on, **3**, 296.
- — — — — hydrobromide, **3**, 286.
- — — — — platinum-salt of, **3**, 286.
- Ethylate of sodium, absolute, **22**, 200, 442.
- — — — — deportment of ethyl cyanate with, **13**, 70.
- Ethylate of thallium, **17**, 149.
- Ethyl-bases, separation of, by means of oxalic ether, **24**, 262.
- Ethyl-benzoic acid, **22**, 366.
- Ethylbenzotartaric acid, **20**, 142.
- Ethylbromaniline, **3**, 292.
- Ethyl-bromosalicylic hydride, **20**, 425.
- Ethylbrucine, periodides of, **24**, 399.
- Ethyleaffine, periodide of, **18**, 102.
- Ethylechloraniline, **3**, 291.
- Ethyleinchonine, tri-iodide of, **24**, 399.
- Ethylecodeine, action of ethyl iodide on, **6**, 137.
- Ethyl-compound, preparation of propionic acid by the action of carbonic acid on an, **11**, 103.
- Ethyl-compounds, oxygenated, **25**, 605.
- Ethyl-crotonate of copper, **18**, 137.
- — — — — of ethyl, **18**, 134.
- — — — — of lead, **18**, 137.
- — — — — of silver, **18**, 136.
- Ethyl-erotic acid, action of potassium hydrate on, **18**, 138.
- Ethyl-erotic acid, formation of, **18**, 134.
- Ethylexamethane, **3**, 92.
- Ethylidacetic acid, action of phosphorus pentachloride on, **24**, 812.
- Ethylidiazobenzolimide, **20**, 53.
- Ethylidbenzoïn, **24**, 536.
- Ethylidibutyl oxamate, **24**, 122.
- Ethylene, action of bisulphide of chlorine upon, **12**, 113; **13**, 36.
- Ethylene, action of chloride of sulphur upon, **12**, 116.
- Ethylene, action of chromic acid on, **25**, 590.

Ethylene, compounds of, with iridious chloride, **25**, 48.
 Ethylene, conversion of, into alcohol, **17**, 39.
 Ethylene, conversion of marsh-gas into, **17**, 43.
 Ethylene, electric spectra of metals taken in, **17**, 85.
 Ethylene, formation of, from acetylene, **17**, 39.
 Ethylene, oxidation of, **19**, 491.
 Ethylene, structure of, **24**, 1027.
 Ethylene and amylenes, action of the chlorides of sulphur upon, **12**, 112.
 Ethylene bisulphodichloride, **13**, 134; **14**, 129.
 Ethylene bromide, **13**, 67.
 ——— action of, on triethylarsine, **14**, 336.
 ——— action of, on triethylphosphine, **14**, 76.
 ——— action of, on pyridine, **14**, 161.
 ——— decomposition of, by water, **24**, 1027.
 ——— dibrominated, **14**, 206.
 Ethylene chloride, **11**, 96.
 ——— action of, on triethylphosphine, **14**, 316.
 ——— easy method of preparing, **8**, 157.
 Ethylene, chlorobrominated, **17**, 420.
 Ethylene cyanide, action of nitric and hydrochloric acids on, **15**, 137.
 ——— action of potash on, **15**, 136.
 ——— formation of, by electrolysis of acetic acid, **25**, 485.
 ——— preparation of, **15**, 135.
 Ethylene, dichlorinated, action of light upon, **25**, 891.
 Ethylene iodide, action of, on acetylide of copper, **24**, 903.
 ——— action of metals on, **12**, 258.
 ——— action of, on triethylphosphine, **14**, 318.
 Ethylene, monobrominated, metamorphosis of, **13**, 68.
 Ethylene oxide, compounds of, with acids, **15**, 398.
 ——— compounds of, with ammonia, **15**, 405.
 ——— considered as a link between organic and mineral chemistry, **15**, 387.
 ——— hydrates of, **15**, 394.
 ——— oxidation of, **15**, 393.
 Ethylene, sulphethers of, **24**, 1189.
 Ethylene, tribrominated, **14**, 207.
 Ethylene-bases, **34**, 141; **25**, 500.
 ——— preparation of, on the large scale, **24**, 930.
 Ethylene-diamides, **25**, 501.

Ethylene-diamine, action of carbon disulphide on, **25**, 501.
 Ethylene-diamine sulphate, optical properties of, **25**, 626.
 Ethylene-dilactamic acid, **24**, 127.
 Ethylene-diphosphonium, hybrids of, **14**, 319.
 Ethylene-dipiperidyl-diamine, **24**, 1063.
 Ethylene-dipyridyl-diammonium, **14**, 164.
 Ethylene-group of diatomic phosphorus bases, **14**, 76.
 Ethylene-hexethyl-diarsonium, compounds of, **14**, 338.
 Ethylene-hexethyl-diphosphonium, **13**, 320.
 Ethylene-hexethyl-diphosphonium, action of heat on the hydrate of, **14**, 103.
 Ethylene-hexethyl-diphosphonium, compounds of, **14**, 92, 102.
 Ethylene - hexethyl - phospharsonium, compounds of, **14**, 333.
 Ethylene-lactamic acid, **24**, 127.
 Ethylene-lactic acid, purification of, **24**, 361.
 Ethylene-methyl-triethyl-phosphammonium, **14**, 328.
 Ethylene-naphthalene, conversion of, into acenaphthene, **25**, 700.
 Ethylene - pentethyl - phosphammonium, compounds of, **14**, 331.
 Ethylene-protocatechuic acid, **24**, 1051.
 Ethylene-sodium, hydrated oxide of, **22**, 200.
 Ethylene-sulphocarbamide, **25**, 501.
 Ethylene - tetrethylphosphammonium, compounds of, **14**, 328.
 Ethylene - triethylarsammonium, compounds of, **14**, 339.
 Ethylene - triethyl - phosphammonium, gold-salt of, **14**, 326.
 Ethylene - triethyl - phosphammonium, platinum-salt of, **14**, 325.
 Ethylene-trimethyl - triethyl-phosphammonium, compounds of, **14**, 333.
 Ethyl-glycide, **25**, 686.
 Ethylglyoxalate of ethyl, **21**, 205.
 Ethylhyposulphurous acid, **22**, 302.
 Ethylic ether of tolylene, **25**, 817.
 Ethylic ethers of uramidobenzoic and carboxamidobenzoic acid, **25**, 81.
 Ethylidene, **12**, 236.
 Ethylidene bromide, **25**, 233.
 Ethylidene-glycol, trichlorinated diacetate of, **25**, 247.
 Ethylidene-lactic acid, **24**, 546.
 Ethyllactic acid, **24**, 127.
 Ethylmeconate of barium, acid, **6**, 74.
 Ethylmeconate of silver, acid, **6**, 74.
 Ethyl-methyl carbinol, conversion of normal butyl alcohol into, **25**, 474.

Ethyl-nitrosalicylic acid, **20**, 429.
 Ethyl-*o*-naphthyl ether, **6**, 313.
 Ethylomeconic acid, **6**, 74.
 Ethylnaphthalamine, **9**, 264.
 Ethylnitraniline, **3**, 292.
 Ethylnitrophenylamine, **3**, 292.
 Ethyl-oxamide, **3**, 95.
 Ethyloxy-oxalyl chloride, **24**, 820.
 Ethylphenamine, or ethylphenylamine, **3**, 96, 285.
 Ethyl-phenyl ketone, oxidation of, **24**, 1058.
 Ethyl-phosphine, **24**, 715.
 Ethylphosphines, oxidation-products of, **25**, 420.
 Ethylphosphinic acid, **25**, 422.
 Ethylphosphites of barium, **7**, 219.
 Ethylphosphoplatinic ether, **25**, 1091.
 Ethylphosphoplatinous ether, **25**, 1088.
 Ethylpiperidine, **6**, 179.
 Ethylpiperidine hydrochloride, **6**, 180.
 Ethyl-quinine, **7**, 279.
 Ethyl-quinine tri-iodide, **24**, 399.
 Ethyl-salicyl benzoate, **7**, 61.
 Ethyl-salicyl hydride, **20**, 422.
 Ethyl-salicyl hydride, action of acetic anhydride on, **20**, 588.
 Ethyl-salidine, **20**, 427.
 Ethyl-sparteine, **15**, 7.
 Ethyl-sparteine, action of ethyl iodide on, **15**, 7.
 Ethyl-tartaric ether, **20**, 155.
 Ethyl-toluidine, **7**, 70.
 Ethyl-trithionates, metallic, **10**, 58, 63.
 Ethyl-trithionic acid, **10**, 60.
 Ethyl-trithionic ether, **10**, 63.
 Ethyl-urea, piperidic, **6**, 178.
 Eucalyptene, **25**, 3.
 Eucalyptus, sugar of the, **1**, 159.
Eucalyptus amygdalina, oil of, **17**, 10.
Eucalyptus oleosa, oil of, **17**, 10.
 Eudiometer with movable spark-wires, **24**, 301.
 Endiometric combustions of gases mixed with nitrogen, formation of nitric acid in, **111**, 245.
 Eudiometry, Liebig's method of, **4**, 221.
 Eugenol, **24**, 704.
 Eulyte, **25**, 98.
 Euosmite, distinction of, from rosthornite, **24**, 1175.
 Exenite, **25**, 200, 293.
 Evacuation, alvine, object of, **15**, 418.
 Evaporation and condensation of solid bodies, length of time required for, **24**, 879.
 Evaporation and precipitation, balance between, **25**, 1038.
 Evaporation of waters and incineration of the residue, **18**, 119.
 Exalbumin, **24**, 1071.

Excrement of the common bat, **24**, 424.
 Excrements, fatty matters of human, in disease, **10**, 162.
 Exeretin, its relation to cholesterin, **15**, 418.
 Exercise, effect of, on the elimination of nitrogen, **24**, 412.
 Exosmose, influence of pressure on, **25**, 974.
 Expansibility of some solutions, **24**, 1125.
 Expansion of alloys by heat, **20**, 206.
 Expansion of gases, variations in the coefficient of, **24**, 475.
 Expansion of liquids, **24**, 94.
 Expansion of solids, heat of, **25**, 780.
 Expansion of water, **19**, 30.
 Expansions, relative, of mixture of alcohol and water under the influence of a certain rise of temperature, **2**, 224.
 Experimental illustration of the composition of ammonia in lectures, **13**, 77.
 Explosion of detonating compounds, theory of, **25**, 874.
 Explosions, suggestion for the prevention of, in working with fulminating mercury and other inflaming compositions, **25**, 267.
 Explosive agents, contributions to the history of, **23**, 41.
 Explosive compounds, temperatures of inflammation and detonation of, **25**, 185.
 Explosive force of gunpowder and other detonating substances, **24**, 644.
 Exsiccation of medical herbs, effects of, **4**, 159.
 Extract of meat, new base from, **24**, 716.
 Extracts of meat from a physiological point of view, **25**, 158.

F.

Fabrics, method of applying aniline-green to, **14**, 253.
 Faraday, lecture (May 30th, 1872) by Prof. Cannizzaro: considerations on some points of the theoretic teaching of chemistry, **25**, 941.
 Farm-yard manure, composition of, **25**, 522.
 Farnham water, analysis and properties of, **4**, 397.
 Fasting, tissue-change during, **25**, 84.
 Fat, amount of digestible, in fodder, **24**, 1192.
 — determination of, in soft soaps, **24**, 969.
 — formation of, in the animal body, **1**, 164.
 — spontaneous change of, **1**, 230.

- Fat, storing up of, in the organism, **25**, 1031.
- Fat, human, composition of, **5**, 84.
- — — slow decomposition of, **5**, 86.
- Fat of meadow hay, composition and digestibility of, **25**, 1037.
- Fat from various mines, analyses of, **1**, 231.
- Fat in seeds, influence of germination on the amount of, **25**, 317.
- Fats, isomeric transformations of, **5**, 197.
- — — melting and solidifying points of, **24**, 476.
- — — neutral, emulsifying of, by the pancreatic juice, **15**, 416.
- — — purification of, **24**, 459, 460.
- — — separation of, **5**, 82, 84.
- — — synthesis of, **17**, 47.
- Fats, animal, extraction of, **24**, 1097.
- Fats, animal, synthesis of the proximate principles of, **6**, 280.
- Fats, glycerin-, various modes of testing the purity of, **5**, 198.
- Fats, neutral, their transformation into fatty acids in the stomach, **15**, 414.
- Fats, vegetable, elementary composition of, **24**, 1192.
- Fats and oils, preliminary notice on the action of ammonia on, **7**, 200.
- Fatty acids, constitution of, **19**, 429.
- — — emulsifying of, by the bile and pancreatic juice, **15**, 416.
- — — emulsifying of, by phosphate of soda, **15**, 415.
- — — in the fusel-oil of Hungarian wine, **24**, 359.
- — — solid, volatile, of cocoa-nut oil, **1**, 404.
- Fatty constituent of beer-yeast, **24**, 942.
- Fatty ketones, **24**, 561.
- Fatty series, nitro-compounds of, **25**, 682, 804.
- Feculencies of sugar-, analysis of, **3**, 367.
- Feeding, change of material in the adult sheep under uniform, **24**, 729.
- Feeding-stuffs, valuation of commercial, **25**, 520.
- Feed-water, on an acid, from the coal-field of Stellarton, Nova Scotia, and the results of its use, **23**, 155.
- Felspar, influence of saline solutions and other agents, on the weathering and decomposition of, **25**, 386.
- Felspar from Blansko in Moravia, **24**, 1177.
- Felspar of Jersey, presence of phosphoric acid in, **11**, 256.
- Felspar from the syenite of Laurvig, **25**, 290.
- Felspar from the syenite of Monte Monzoni, **25**, 290.
- Felspars, researches on, **25**, 50.
- Felspars, sodioalcalic, chemical composition of, **25**, 288.
- Ferment which effects the conversion of cane-sugar into grape-sugar, **25**, 317.
- Fermentation, influence of pressure on, **25**, 570.
- — — new theory of, **24**, 897.
- — — observations on, **11**, 21.
- — — phenomena of, considered in relation to dehydration, **24**, 336.
- — — proof of the presence of sugar in healthy urine by, **14**, 39.
- Fermentation, acid, of wheat-bran, **24**, 545.
- Fermentation, alcoholic, **24**, 426.
- — — by beer yeast, cause of, **25**, 260.
- — — formation of ammonia in, **24**, 916.
- — — formation of leucine and tyrosine in, **25**, 260.
- Fermentation, alcoholic, and mode of nutrition of the yeast plant, **24**, 426.
- Fermentation alcohol of milk-sugar, **25**, 316.
- Fermentation, alcoholic and carbonic, of sodium acetate and ammonium oxalate, **24**, 511.
- Fermentation alcohols, researches on, **25**, 886.
- Fermentation butyl alcohol, conversion of normal butyl alcohol into, **25**, 474.
- Fermentation of fruit, **24**, 836; **25**, 906.
- Fermentation-test of sugar, **14**, 24.
- Fermentation-test for sugar, comparison of the delicacy of, with that of Fehling's standard solution, **14**, 27.
- Fermenting mashes, influence of secondary extract formation in, **24**, 1223.
- Ferments, behaviour of, with phenol, **24**, 842.
- — — development of alcoholic, and other, in fermentable liquids, without the direct intervention of albuminoid matters, **25**, 260.
- — — origin and nature of, **25**, 259, 261.
- Ferments, alcoholic, pretended transformation of bacteria and mucedinea into, **25**, 261.
- Ferments, lactic and alcoholic, origin of, **25**, 259.
- Ferments, unorganised, **25**, 903.
- Fern, alkaloids obtained from, **3**, 315.
- Ferric acid, **1**, 240; **11**, 25.
- Ferric acid, volumetric estimation of, **8**, 232.
- Ferric benzoglycolate, **5**, 77.

- Ferric carbonate, **13**, 91.
 Ferric chloride, dissociation of, in aqueous solutions of, **24**, 662.
 Ferric comenate, **11**, 8.
 Ferric coumarilate, **24**, 48.
 Ferric hydrate, **24**, 497.
 ——— action of heat on, in presence of water, **19**, 69.
 ——— from Cornwall, **18**, 214.
 Ferric iodates, **24**, 108.
 Ferric nitrate, osmose of, **8**, 88.
 Ferric oxide, absorption of ammonium salts by, **21**, **11**, 14.
 ——— absorption of potassium salts by, **21**, 6, 13.
 ——— part which it plays in the manufacture of superphosphates, **25**, 848.
 ——— specific gravity and atomic volume of, **11**, 80.
 Ferric oxide and alumina, separation of, **25**, 920.
 Ferric pyromecconate, **6**, 80.
 Ferric pyrophosphate, allotropic, **20**, 438.
 Ferric pyrophosphate, normal, **20**, 436.
 Ferric salts, chromatic phenomena of, **10**, 85.
 ——— state of, in solution, **25**, 214.
 Ferric sucrate, dialysis of, **15**, 253.
 Ferric sulphate and chloride, solubility of, **11**, 16.
 Ferric sulphates, **11**, 294.
 Ferrieyanide of iron, dialysis of, **15**, 253.
 Ferrieyanide of potassium, action of, on ferric salts, **18**, 27.
 ——— action of light on, **24**, 303.
 ——— decomposition of a solution of peroxide of hydrogen by, **16**, 322.
 ——— preparation of, **9**, 128.
 ——— solubility of, **7**, 80.
 ——— use of, as a test for cobalt, nickel, and manganese, **24**, 757.
 Ferri- and ferro-cyanides of thallium, **17**, 148.
 Ferrocyanide of copper, dialysis of, **15**, 251.
 Ferrocyanide of potassium, action of oil of vitriol on, **1**, 251.
 Ferrocyanides, **1**, 38.
 Ferrocyanogen, estimation of, **25**, 90.
 Ferromanganese, estimation of manganese in, **24**, 756.
 Ferrotungstine, **25**, 992.
 Ferrous oxide, volumetric estimation of, alone, and in conjunction with ferric oxide, **8**, 234.
 Ferrous perchlorate, **16**, 88.
 Ferrous sulphate, double salts of, **25**, 1078.
 Ferrous sulphate, osmose of, **8**, 87.
 Ferrous sulphate precipitated by alcohol, amount of combined water in, **25**, 225.
 Ferrous sulphites, **11**, 293.
 Fertilising matters: necessity of adding them to the land in quantities larger than those which are removed in the crop, **24**, 282.
 Fettingling material for puddling furnaces, **25**, 556.
 Fibres, presence in certain, of a substance susceptible of some striking colorific changes when chemically treated, **25**, 1111.
 Fibrin, coagulation of, **25**, 632.
 ——— origin of, and its sources in the organism, **25**, 157.
 ——— peptones of, **25**, 629.
 Fibrin of blood, action of pepsin on, **25**, 630.
 Fibrin of muscular flesh, **3**, 188.
 Fibrin, albumin, casein, and gelatin, volatile products of decomposition of, by means of peroxide of manganese, or by chromic acid and sulphuric acid, **1**, 82.
 Fichtelite from recent pine-timber, **25**, 1083.
Ficus rubiginosa, resin of, **15**, 62.
 Filters, use of porous hollow cones as, **24**, 1083.
 Filtration, improvement of London water by, **4**, 392.
 Fire, chemical report on the cause of the, in the "Amazon," **5**, 34.
 Fire, protection of textile fabrics, &c., from, **25**, 337.
 Fire, red, green, and blue, **24**, 970.
 Fire-bricks, determination of silica and titanio acid in, **15**, 322.
 Fire-clays and fire-bricks, determination of alkalis in, **15**, 104.
 Fire-damp of the Newcastle coal mines, composition of the, **11**, 7.
 "First runnings" from the alcohol manufacture, observations on the, **24**, 1187.
 Fishes, gases contained in the swim-bladder of certain fresh-water, **25**, 254.
 Fishes, respiration of, **25**, 637.
 Fish-roses, albumin from, **24**, 968.
 Flame, a new sensitive singing, **25**, 875.
 Flames, resounding, **25**, 279.
 Flames, reversed, **24**, 187.
 Flames, temperature of, **13**, 273.
 Flames, vibrating sounds of, **25**, 219.
 Flasks, method of quickly drying, **25**, 527.
 Flax, alkaloids obtained from, **3**, 312.
 Flax, cultivation-experiments with, **25**, 911.

- Flax-plant, analysis of the mineral constituents of the, and of the soils on which the plants have been grown, **2**, 78.
- Flesh, new base from the juice of, **10**, 121.
- difference between lactic acid produced by the fermentation of sugar and that contained in the juices of, **1**, 400.
- fibrin of muscular, **3**, 188.
- variations in the proportions of water, fat, and nitrogen in, **25**, 1103.
- Flesh-juice of *Phocæna communis*, **24**, 426.
- Flour, examination of, **24**, 161, 858.
- examination of, for alum, **25**, 1103.
- Flour-mills, cause of explosions in, **25**, 939.
- percentage of gluten in, **10**, 48.
- Flowers, decoloration of, by the electric discharge, **24**, 883.
- decoloration of, by electricity, **25**, 262.
- Fluorescein, **24**, 911.
- Fluorescence, **24**, 482, 798; **25**, 1058.
- Fluorescence, application of, to the detection and discrimination of organic substances, **17**, 311.
- Fluorescence of anthracene and its derivatives, **24**, 21.
- Fluorescence of chlorophyll, **25**, 159.
- Fluorescence of peppermint-oil, **24**, 154.
- Fluorescent solutions, colour of, **24**, 992; **25**, 27.
- Fluorescein, **24**, 894.
- Fluids, effects of heat on, **16**, 263.
- Fluids, circular polarisation of light by transmission through, **11**, 26.
- Fluobenzene, **24**, 368.
- Fluobenzoic acid, **24**, 368.
- Fluoride of iodine, preparation of, **11**, 162.
- Fluoride of silver, **25**, 790.
- Fluorides, neutral, of the alkalis, etching on glass with, **21**, 256.
- Fluorine, sources from which it is derived, **11**, 134.
- detection of, when accompanied by silica, **5**, 151.
- occurrence of, in recent as well as in fossil bones, **11**, 97.
- Fluorine and phosphoric acid contained in different geological strata, **1**, 233.
- Fluorine-compounds, application of certain, to the preparation of frosted glass for photographic purposes, **24**, 166.
- — specific heat of, **19**, 197, 225.
- Fodder, amount of digestible fat in, **24**, 1192.
- Fodder, Carthusian pink as, **25**, 1036.
- Food, actual energy developed by one gram of various articles of, when burnt in oxygen, and when oxidized in the body, **21**, 49.
- composition of standard articles of, **10**, 53.
- discourse on the composition of the animal portion of our, and on its relations to bread, **12**, 54.
- influence of different earthy phosphates mixed with the, on the composition of the bones, **25**, 897.
- influence of, on the production of milk in the cow, **24**, 414.
- dried at 100° C., results of experiments with, in heat-units, **21**, 48.
- weight and cost of various articles of, required to be oxidized in the body in order to raise 140 lbs. to the height of 10,000 feet, **21**, 50.
- weight of various articles of, required to sustain respiration and circulation in the body of an average man during twenty-four hours, **21**, 51.
- Food-stuffs, analyses of, **25**, 317.
- Food-stuffs, composition of some, **25**, 840.
- Food-supplies of Paris during the late siege, **24**, 459.
- Forest marble of Cirencester, manganese in, **18**, 207.
- Forest-soil, state of a, before and after liming, **25**, 169.
- Formamide, **16**, 72.
- Formate of ethyl, capillary transpiration of, **15**, 439.
- — preparation of, **21**, 479, 485.
- — vapour-tension of, **21**, 481, 487.
- Formate of lead, sulphur-compound formed by the action of sulphuretted hydrogen on, at a high temperature, **15**, 278.
- Formate of thallium, **17**, 148.
- Formic acid, absorption of its vapour by charcoal, **20**, 164.
- — action of, on nitrate of amyl, in presence of sulphuric acid, **22**, 190.
- — capillary transpiration of, **15**, 435.
- — composition of aqueous, of constant boiling-point, **15**, 271.
- — conversion of, into methyl alcohol, **24**, 343.
- — formation and preparation of, **9**, 182.
- — obtained from human urine during the decomposition of urochrome, **23**, 400.
- — oxidation of, **20**, 289.

Formic acid, production of, by oxidation of mannite and glycerin with potassic bichromate and sulphuric acid, **20**, 31.
 — — — reaction of, with nitrite of amyl, **20**, 579.
 — — — reduction of, to formaldehyde and methyl alcohol, **25**, 234.
 — — — resolution of, into carbonic acid, marsh-gas, and water, **17**, 41.
 — — — synthesis of, **17**, 40 ; **20**, 133, 291.
 Formic acid and alcohol, action of, on indigo-blue, **19**, 475.
 Formic acid, nascent, syntheses by means of, **24**, 859.
 Formic ether, physiological action of, **25**, 638.
 Formic ethers, tribasic, **7**, 227.
 Formiline, **8**, 153.
 Formulae, constitutional, **19**, 375.
 Formulae, on Kolbe's additive, **7**, 122.
 Formulae, structural, **24**, 331.
 Formulae, typical use of, **13**, 246.
 Formylne, identity of, with methylamine, **3**, 89.
 Fossil bones, determination of ossein in, **24**, 733.
 Fossil resin perhaps related to the amber-producing Flora, **24**, 892.
 Fractional distillation. See Distillation.
 Francolite from Cornwall, **24**, 3.
 Frangulic acid, a derivative of anthracene, **25**, 78.
 Fraxin compared with pavin, **11**, 21.
 Freezing of water, **24**, 795 ; **25**, 976.
 Freezing of water and bismuth, **21**, 71.
 Freislebenite, **24**, 667.
 Friction of cast-iron, heat developed by, **3**, 320.
 Friction of mercury, heat developed by, **3**, 320.
 Friction of water, heat developed by, **3**, 319.
 Frictional electricity, experiments on the explosion of gunpowder by, **14**, 174.
 Fruit, fermentation of, **24**, 836 ; **25**, 906.
 Fuchsine, or magenta, **14**, 237.
 Fuchsine, new method of detecting, **25**, 1127.
 — — — dyeing of cotton with, without mordants, **25**, 532.
 — — — dyeing of silk with, **14**, 250.
 — — — dyeing of wool with, **14**, 251.
 — — — dyeing wool amaranth-colour with, **24**, 971.
 — — — preparation of, by the action of bichloride of tin on aniline, **14**, 237.
 — — — preparation of, by the action of mercurous nitrate on aniline, **14**, 238.

Fuchsine, properties of, **14**, 239.
 — — — refraction-relations of, **24**, 884.
 Fuci, lead, copper, and silver in, **3**, 70.
Fucus vesiculosus, *F. serratus*, and *F. nudosus*, mannite contained in, **11**, 138.
 Fucosol, **25**, 298.
 Fulminate, mercuric, explosion of, **23**, 44.
 Fulminating mercury, suggestion for the prevention of explosions in working with, **25**, 267.
 Fulminic acid, derivatives of, **25**, 412.
 — — — artificial formation of urea from, **1**, 228.
 Fumaramide, analysis of, **1**, 35.
 Fumarate of ammonia, transformation of, into malic acid, **5**, 63.
 Fumaric acid, molecular weight of, **25**, 891.
 Fumaric and phenacetic acid, identity of, **25**, 144.
 Fungi, nutritive and assimilative properties in, **24**, 1205.
 Furfurine, formation of, **7**, 95.
 Furnace, chemical lamp-, **11**, 218.
 Furnace temperatures, measurement of, by increase of electric resistance in conductors with rise of temperature, **24**, 478.
 Furnaces, contributions to the knowledge of the slags from iron, **1**, 396.
 Fusel-oil vapour, absorption of, by charcoal, **18**, 289.
 Fusing points of alloys, **20**, 207.
 Fuzes, Abel's, for firing gunpowder with magneto-electric apparatus, **14**, 182, 185.

G.

Gadolinite in the Radauthal, **25**, 294.
 Gahnite, **24**, 115.
 Gaize, use of, for the preparation of alkaline silicates, **24**, 763.
 Galactin, **24**, 1071.
 Gallein, **24**, 699.
 Gallein and gallin, **24**, 833.
 Gallic acid, a derivative of, **24**, 374.
 — — — formation of, **24**, 706.
 — — — oxidation of, by electrolysis, **24**, 918.
 Gallic acid and gallie ether, **25**, 820.
 Gallie ethers, **24**, 821.
 Gall-stones, **16**, 34.
 Gall-stones, human, analysis of, **14**, 121.
 Gall-stones of the ox, analysis of, **14**, 123.
 Gall-stones, theory of, **14**, 116.
 Gallotannic acid, solubility of, in ether, **13**, 325.

- Galvanic action, some cases of, **1**, 142.
 Galvanic battery, coal-gas-carbon and nitric acid, **9**, 198.
 Galvanic battery, use of potassium permanganate in the, **25**, 279.
 Galvanic battery elements, **25**, 120.
 Galvanic couples, experiments with, **2**, 97.
 Galvanic couples immersed in pure water and in oxygenated water, experiments with, **III**, 380.
 Galvanic element of economical construction, **25**, 971.
 Galvanic elements, apparatus for the convenient arrangement of certain combinations of, **24**, 884.
 Galvanometer, balance-, **2**, 26.
 Garanceux, **12**, 207.
 Garancin, **12**, 200, 207.
Gardenia lucida, gum of, **9**, 238.
 Gardenin, **9**, 239.
 Garlic, essence of, **10**, 320.
 Garnet, idocrase, &c., experiments on the density of, **17**, 386.
 Gas, carbonic acid, amount of, contained in the Bonnington water, **II**, 215.
 Gas, coal-, bisulphide of carbon in, **13**, 85.
 ——— igniting point of, **16**, 398.
 ——— contributions to the knowledge of the manufacture of, **5**, 39.
 ——— use of, as fuel, in organic analysis, **6**, 209; **11**, 30.
 Gas, combustible, absence of, in the emanations of the Caldeira de Furnas, San Miguel, Azores, **25**, 885.
 Gas evolved from the volcanic island of Santorin after the eruption of 1866, **25**, 885.
 Gas, hydrochloric acid, relation between the amount of, absorbed in water under the ordinary atmospheric pressure, and the temperature at which the absorption occurs, **12**, 136.
 ——— relation between the amount of, absorbed in water at 0° C., and the pressure under which the absorption occurs, **12**, 129.
 Gas, illuminating, from Bohemian lignite, **25**, 1138.
 Gas-absorption, contributions to the knowledge of the laws of, **14**, 1.
 Gas-analysis, **21**, 128; **25**, 918.
 ——— McLeod's form of apparatus for, **22**, 313.
 ——— Magnus's, for organic analysis, **7**, 250.
 ——— new method of, **17**, 238.
 ——— new form of, **25**, 182.
 Gaseous compounds, decomposition of, by electrical incandescence, **12**, 273.
 Gaseous constituents of waters, estimation of, **18**, 124.
 Gaseous diffusion through brick and mortar walls, **10**, 256.
 Gaseous mixtures, force of detonating, **24**, 300.
 Gaseous mixtures, motion and equilibrium considered with especial reference to the diffusion of, **24**, 884.
 Gaseous and liquid states of matter, continuity of, **23**, 74.
 Gases, absorption of, by the blood, **25**, 1030.
 ——— absorption of, by soils, **24**, 853.
 ——— absorption and dialytic separation of, by colloidal septa, **20**, 235.
 ——— action of the electric discharge on oxygen and other, **13**, 314.
 ——— apparatus for collecting, over water or mercury, **6**, 44.
 ——— improved apparatus for the analysis of (Frankland and Ward's), **6**, 197.
 ——— automatic thermo-regulator for use in the preparation of, **24**, 639.
 ——— rate of cooling of, **25**, 972.
 ——— compressibility and dilatation of, **24**, 874.
 ——— diathermic power of, **17**, 73.
 ——— drying of, **25**, 594.
 ——— force of diffusion of, through porous septa, **25**, 594.
 ——— law of Dulong and Petit relating to, **24**, 300.
 ——— elementary deduction of the fundamental equation of the dynamical theory of, **24**, 300.
 ——— convenient apparatus for evolving, **25**, 785.
 ——— expansion of moist, **25**, 666.
 ——— unequal heat-conducting power of, **24**, 298.
 ——— conduction of heat in, **25**, 591.
 ——— heat disengaged by the solution of, in water, **6**, 241.
 ——— heat evolved in the condensation of, by porous bodies, **6**, 251.
 ——— heat evolved or absorbed by the sudden compression or expansion of, **6**, 251.
 ——— interdiffusion of, **17**, 359.
 ——— internal constitution of, **25**, 383.
 ——— internal motion of, **24**, 797.
 ——— application of the measurement of, to quantitative analysis, **21**, 310.
 ——— molecular mobility of, **17**, 334.
 ——— molecular volumes of, **24**, 300.
 ——— formation of nitric acid in eudiometric combustions of, mixed with nitrogen, **III**, 245.
 ——— passage of, through metallic septa at a red heat, **20**, 257.

- Gases, effect of pressure on the absorption of, by charcoal, **24**, 76.
- relation between chemical composition and refractive power of, **24**, 183.
- solution of, in water, **23**, 36.
- table of the thermometric results produced by sudden change of volume in, **6**, 253.
- effects of temperature on the absorption of, by charcoal, **25**, 649.
- theory of the molecular motions of, **24**, 884.
- transference of, by Sprengel's vacuum-tube, **20**, 246.
- variation in the coefficient of expansion of, **24**, 475.
- change in volume of, by pressure, **25**, 1067.
- Gases from blast-furnace, utilisation of, **22**, 234.
- Gases taken from various depths of a blast-furnace, analysis of, **22**, 224, 331.
- Gases of the blood, analysis of the, **25**, 265.
- Gases of the blood in the pulmonary capillaries, tension of the, **25**, 311.
- Gases evolved from the *Campi Flegrei* (June, 1869), composition of, **25**, 834.
- Gases enclosed in coal, **24**, 899; **25**, 798.
- Gases enclosed in English coal, **25**, 801.
- Gases from Gateshead and Killingworth, examination of, **III**, 7.
- Gases, incandescant, spectra of, **24**, 483.
- Gases, mixed, absorption of, in water, **17**, 88.
- — — diffusion of, into a vacuum, with partial separation, **17**, 350.
- Gases occluded in meteoric iron from Augusta Co., Virginia, **25**, 797.
- Gases evolved from the cells and intercellular passages of living plants in the shade, composition of, **16**, 146.
- Gases resulting from the explosion of nitroglycerin, method of determining, **24**, 1219.
- Gases, simple, spectra of, **24**, 991.
- Gases of Solfataras, **25**, 469.
- Gases from the Solfatara at Puzzuoli, composition of, **25**, 294.
- Gases contained in the swim-bladder of certain fresh-water fishes, **25**, 254.
- Gases dissolved in the Harrogate waters, **7**, 175, 179.
- Gases existing in solution in natural waters, apparatus for determining the quantities of, **22**, 307.
- Gases incident to water analysis, simple apparatus for determining, **21**, 109.
- Gases and vapours, apparatus for submitting, to the electric discharge, **25**, 970.
- Gas-flame, electric condition of, **25**, 976.
- Gas-furnace, Griffin's, **23**, 280.
- Gas-furnace, regenerative, as applied to the manufacture of cast-steel, **21**, 279.
- Gas-lime, composition of, **II**, 359.
- Gas-liquor, utilisation of the waste-substances in, **25**, 338.
- Gas thermo-regulator for high temperatures, **25**, 667.
- Gas-washing and gas-absorption apparatus, **24**, 797.
- Gas-water, benzoic acid in, **25**, 1097.
- Gasteropods, red colour of the pharynx of, due to hæmoglobin, **25**, 255.
- Gastric juice, acidity of, **15**, 410.
- — — its action on polarised light, **15**, 413.
- — — researches on the constituents of, **14**, 256.
- — — optical rotatory power of, **14**, 256.
- Gaultherate of sodium, action of benzyl chloride on, **21**, 124.
- Gaultheria oil, constitution of, **24**, 959.
- Gelatin, dry, quantities of ammonia evolved from, by potash and by permanganate, **25**, 646.
- Gelatin-films, coloured, as objects for the spectroscope, **25**, 118.
- Gelatin relief-forms, silvering of, for galvanoplastic work, **24**, 767.
- Gelatin, solubility of, in glycerin, **24**, 724.
- Gelatin, albumin, fibrin, and casein, volatile products of decomposition of, by peroxide of manganese, or by chromic and sulphuric acids, **1**, 82.
- Gelatin and alkaline dichromates, action of light on mixtures of, **24**, 304.
- Gelatiniform matter, **24**, 1071.
- Gelatinous tissues, occurrence of, in invertebrata, **24**, 849.
- Genthite (nickel-gymnite), analysis of, from North Carolina, **25**, 680.
- Geology, chemical, **21**, 213.
- Geraniol, **24**, 261.
- Germanium oil, Indian, **17**, 10; **24**, 261.
- Gerhardt's parathionic acid, non-existence of, **25**, 684.
- Germination, changes of albuminoids during, **25**, 907.
- — — increase of temperature during, **25**, 907.
- — — influence of, on the amount of fat in seeds, **25**, 317.

- Germination of seeds, experiments on, **24**, 748.
 — of oleaginous seeds, **24**, 1207.
 Gilding of silk, **24**, 450.
 Girona resin, distinction of, from rosthornite, **24**, 1175.
 Glass, action of vanadium on, **23**, 358.
 — change of colour of, by exposure to sunlight, **21**, 251.
 — devitrification of, **25**, 387.
 — etching on, by hydrofluoric acid and neutral alkaline fluorides, **21**, 256.
 — manufacture of, **21**, 242; **25**, 1131.
 — silvering of, **24**, 859.
 Glass, auriferous, **1**, 76.
 Glass, Bohemian, as found in the combustion-tubes employed in organic analysis, analysis of, **III**, 299.
 Glass, devitrified, analysis of, **25**, 986.
 Glass, frosted, preparation of, by means of certain fluorine-compounds, **24**, 166.
 Glass, green, commercial specimens of, **II**, 247.
 Glass, plate-, analysis of, **2**, 208.
 Glass tubes, instrument for graduating, **III**, 34.
 Glass vessels soiled with petroleum, cleansing of, **24**, 972.
 Glass vessels, use of, in brewing, **24**, 868.
 Glauber's salts, action of low temperatures on supersaturated solutions of, **25**, 284.
 Globe-siphon, Hart's, **25**, 17.
 Glonoin. See Nitroglycerin.
 Glucina, **8**, 244.
 — atomic volume and specific gravity of, **III**, 93.
 Glucinum-ethyl, **13**, 181, 194.
 Glucinum salts, **8**, 244, 247.
 Glucinum selenites, **2**, 62.
 Gluconic acid, **24**, 547.
 Glucose, action of aniline on, **25**, 149.
 — combination of, with copper, **25**, 1122.
 Glucose, dextro-rotatory, from cathartine, **25**, 153.
 — estimation of, **25**, 179.
 — formation of, from cane-sugar, by the action of light, **25**, 65.
 — reaction of, with acetic anhydride, **25**, 69.
 — transformation of, into monatomic and hexatomic alcohols, **25**, 66.
 Glucose-containing sugars, examination of, **24**, 91.
 Glucosides, synthesis of, by means of the acetyl-derivatives of the sugars, **25**, 70.
 Glucosophosphoric acid, **24**, 924.
 Glue for paper labels on bottles, **24**, 971.
 Glutanic acid, occurrence of, amongst the decomposition-products of proteids, **24**, 721.
 Glutanic acid, reduction of, by hydriodic acid, **25**, 815.
 Glutanic acid, rotatory power of, **25**, 814.
 Gluten, forms of ferment to which it gives rise, **23**, 387.
 Gluten, percentage of, in different flours, **10**, 48.
 Glycerate of ethyl, **24**, 908.
 Glycerin, **13**, 71.
 — action of hydriodic acid on, **8**, 192.
 — action of phosphorus iodide on, **8**, 145.
 — action of perchloride of phosphorus on, **5**, 315.
 — application of, to mercerise and mordant vegetable fabrics, **25**, 187.
 — capillary transpiration of, **15**, 441.
 — compounds of, with acetic acid, **6**, 286.
 — compounds of, with acids, **7**, 282.
 — compounds of, with acids, and the synthesis of the proximate principles of animal fats, **6**, 280.
 — compounds of, with butyric acid, **6**, 285.
 — compounds of, with margaric acid, **6**, 284.
 — compounds of, with mineral acids, **6**, 287.
 — compounds of, with oleic acid, **6**, 284.
 — compounds of, with palmitic acid, **6**, 284.
 — compounds of, with stearic acid, **6**, 282.
 — compounds of, with valerianic acid, **6**, 285.
 — compounds of, with various organic acids, **6**, 286.
 Glycerin, crystallised, **20**, 384.
 — derivatives of, **24**, 907; **25**, 479, 686.
 — derivatives, $C_3H_5X_3$, isomerism of, **24**, 907.
 — distillation and boiling point of, **24**, 84.
 — oxidation of, by caustic potash, **20**, 30.
 — oxidation of, by a mixture of potassic bichromate and sulphuric acid, **20**, 31.
 — phenol from, **25**, 61.
 — production of, in alcoholic fermentation, **25**, 572.

Glycerin, reproduction of, **25**, 399.
 — solution of the compounds of, with the oxides of copper and bismuth, **25**, 329.
 — thermal effects of the combination of, with bases, **24**, 976.
 Glycerin and allyl compounds, relations between, **24**, 906.
 Glycerin and sodium, compound of, **25**, 450.
 Glycerin-ether, **25**, 62, 134, 398.
 Glycerin-fats, various modes of testing the purity of, **5**, 198.
 Glycerin-iodopropionic acid, **25**, 687.
 Glycerin-tricarballoylate of barium, **18**, 336.
 Glycergel and glycerol of silicic acid, **17**, 322.
 Glyceryl chloromercosulphate, **24**, 907.
 Glycidamine, **25**, 685.
 Glycocholic acid, improved method of obtaining, **24**, 382.
 Glycocine, formation of, from bromacetic acid, **11**, 29.
 — formulae of, **13**, 247.
 — resolution of cholic acid into, and non-nitrogen acids, **1**, 344.
 Glycoll. See Glycocine.
 Glycogen, evolution of, in the bird's egg, **25**, 837.
 — preparation of, **25**, 83.
 — reaction of, with acetic anhydride, **25**, 67.
 — relation of, to muscular activity, **25**, 156.
 Glyogenesis, animal, **25**, 837.
 Glycogenic function of the liver, and its relation to diabetes, **25**, 901.
 Glycolinic acid, Friedländer's, identity of, with glycollic acid, **25**, 366—377.
 Glycollate, diethyl, **24**, 908.
 Glycollate of silver, **5**, 80.
 Glycollate of zinc, **5**, 80.
 Glycollic acid, **5**, 79.
 — on an aromatic, **24**, 375.
 — conversion of, into bromacetic acid by the action of hydrobromic acid, **17**, 205.
 — formation of, from glyoxylic acid, **18**, 202.
 — formation of, from oxalic acid, **16**, 302.
 — production of, by the action of sodium amalgam on ethylic oxalate, **25**, 369.
 Glycollic acid and glycocine, formation of, from bromacetic acid, **11**, 29, 30.
 Glycols, aromatic, **25**, 816.
 Glycols, chemical properties of, **12**, 224.
 Glyoxylate of calcium and ammonium, **18**, 196.

Glyoxylate of calcium with bisulphite of calcium, **18**, 194.
 Glyoxylate of calcium with lactate of calcium, **18**, 195.
 Glyoxylate of lead and ammonium, **18**, 198.
 Glyoxylate of silver and ammonium, **18**, 198.
 Glyoxylates, action of hydriodic acid on, **18**, 199.
 — action of sulphuretted hydrogen on, **18**, 199.
 — ammoniacal compounds of, **18**, 196.
 Glyoxylic acid, action of zinc on, **18**, 201.
 — compound of, with bisulphite of sodium, **18**, 193.
 — compounds and derivatives of, **18**, 193.
 — constitution of, **21**, 197.
 — formation of, from oxalic acid, **16**, 301.
 Glyoxylide, **21**, 204.
 Guadinite, crystalline form of, **25**, 56.
 Goat's urine, composition of, on a purely vegetable and purely animal diet, **25**, 898.
 Gold, absorption of hydrogen by, **20**, 281.
 — absorption of sulphur by, **24**, 765.
 — action of heat on, and its alloy with copper, **10**, 229.
 — its action on mercuric ethide, **17**, 36.
 — analysis of a mineral containing, from the province of Coquimbo, Chile, **4**, 332.
 — application of chlorine gas to the toughening and refining of, **21**, 506.
 — in the arsenical pyrites of Reichenstein, **24**, 203.
 — detection of, in sea-water, **25**, 1119.
 — loss of, in assaying, from volatilisation, **13**, 98.
 — loss of, in parting operations, from its solubility in nitric acid, **13**, 99.
 — modification of the reactions of, by nitric acid, **10**, 117.
 — refining of, when alloyed with tin or antimony, so as to render it fit for the purposes of coinage, **13**, 31.
 — reflecting power of, for the chemical rays, **17**, 77.
 — specific gravity and atomic volume of, **11**, 62.
 Gold from Vancouver's Island, **24**, 203.
 Gold cyanide, **11**, 80, 82, 86.
 Gold sulphide, action of sodium hydro-sulphide on, **1**, 243.
 Gold, terchloride, osmose of, **8**, 59, 94.
 Gold and platinum salts, osmose of, **8**, 93.

- Gold and silver, a double sulphide of, **25**, 680.
- Gold and silver, improved process of extracting, from the arseniosulphides of lead, copper, etc., **24**, 447.
- Gold and silver, Rivot's process of extracting, from their ores, **24**, 1219.
- Gold and sincalin, hydrochloride of, **6**, 190.
- Gold, solubility of, **11**, 20; **25**, 285.
- Gold and thallium, double chloride of, **17**, 147.
- Gold-assay, **25**, 182.
- Gold-bulion, manipulation of assays of, **23**, 366.
- Gold-dust from the coast of California, analysis of, **2**, 193.
- Gold ruby-glass, **24**, 972.
- Gold-salt of berberine, **15**, 345.
- of bromethyl-triethylphosphonium, **14**, 82.
- of ethylene-hexethyl-diarsonium, **14**, 338.
- of ethylene-hexethyl-diphosphonium, **14**, 101.
- of ethylene-tetethyl-phosphammonium, **14**, 330.
- of ethylene-triethylarsammonium, **14**, 339.
- of ethylene-triethylphosphammonium, **14**, 326.
- of oxethyl-triethylphosphonium, **14**, 85.
- of sparteine, **15**, 3.
- of sulphur-urea, **22**, 6.
- of tetramethylphosphonium, **11**, 74.
- of tetrethylammonium, **4**, 310.
- of tetrethylphosphonium, **11**, 66.
- Goniometer, description of a new, **11**, 550.
- Graduation-houses for salt evaporation, ozone reactions of the air in the neighbourhood of, **25**, 384.
- Grain, preservation of, by keeping in a vacuum, **25**, 320, 940.
- Graminaceous plants, experiments on the assimilation of free nitrogen, by, **16**, 171, 178.
- Granites of Scotland and Donegal, **24**, 208.
- Granulites of Saxony, **24**, 807.
- Grape and malt yeast-plants, comparative fermentative properties of, **23**, 393.
- Grapes, changes in the proportion of acid and sugar in, during the process of ripening, **20**, 378.
- Grape-seed oil, **24**, 703.
- Grape-sugar, decomposition of, by cupric oxide in alkaline solution, **24**, 914.
- Grape-sugar, prevention of precipitation of manganese sulphide by, **10**, 117.
- Graphic acid, **12**, 266.
- Graphite, artificially compressed: its use in experiments on gaseous diffusion, **17**, 335.
- researches on the atomic weight of, **12**, 261.
- analytic and pyrometric estimation of, **25**, 119.
- specific heat of, **19**, 190.
- Graphite from Styria, **24**, 203.
- Graphitoidal substance in grey cast-iron, **14**, 203.
- Graphon, **12**, 268.
- Grass-oil, East Indian, **11**, 122.
- Gravescend waterworks, analysis of water from, **4**, 409.
- Gravities, original, report on, by Graham, Hofmann, and Redwood, **5**, 229.
- Gravity, specific. See Specific Gravity.
- Greasy films, effect of, on the rate of ebullition of liquids, **22**, 145.
- Green, aniline-, or emeraldine, **14**, 241.
- Green, aniline-, method of applying to fabrics, **14**, 253.
- Green, chinoline-, **14**, 216.
- Green fire, **24**, 970.
- Greengages, effects of, on the quantity of hippuric acid in human urine, **17**, 57.
- Greenstone, **24**, 112.
- Grey cast-iron, composition of a carbonaceous substance existing in, **14**, 199.
- Ground-ice, **14**, 111, 113; **15**, 88.
- Guaiacum resin and iodine reaction, **25**, 1115.
- Guaiacum, tincture of, as reagent, **24**, 581.
- Guanidine, **25**, 1100.
- derivatives of, **25**, 1027.
- preparation of, **24**, 263.
- synthesis of, **19**, 249.
- Guanidines, synthesis of substituted, **24**, 143.
- Guanine in the urine of the heron, **24**, 848.
- Guanite, crystallographic measurements of, **11**, 17.
- Guano, alkaloïds obtained from, **3**, 314.
- analysis of concrete, **11**, 151.
- analysis of saline, **11**, 151.
- analysis of samples of, **11**, 149.
- bones taken from, **11**, 223.
- composition of some varieties of South American, **11**, 140.
- from Malden Island, **25**, 1112.
- (Mejillones), preparation of very high-grade superphosphate from, **25**, 849.
- some newly-discovered substances from the African deposits of, **2**, 70.

Guano, phosphatic, solubility of, in carbonic acid water, **25**, 270.
 — relation of sewage to Peruvian, in amount of hydrogen reckoned as ammonia, **19**, 103.
 — two specimens of South Sea, **1**, 36 (p).
 Guano-deposits, analysis of, **III**, 13.
 Guaranine, **25**, 1100.
 Guayacanite, **12**, 10.
 Guernsey, supply of iodine from the kelp of, **III**, 262.
 Grumbelite, **24**, 325.
 Guigerade, analysis of, **II**, 386.
 Gulf-stream, rocks and other dredgings from, **24**, 319.
 — dialysis of, **15**, 257.
 Gum, diffusion of, **15**, 222.
 — thermal effects of the combinations of, with bases, **24**, 978.
 Gum Arabic, reaction of, with acetic anhydride, **25**, 67.
 Gum of *Gardenia lucida* (the Decamalee gum of Scinde), **9**, 238.
 Gum kino, examination of, **1**, 141.
 Gum-resin of New Holland, yellow, **III**, 10.
 Gun-cotton, **III**, 253, 329, 412; **24**, 171.
 — action of light on, **20**, 511.
 — alkalis, effects of heat on, **20**, 511.
 — analysis of, **16**, 2.
 — chemical composition of, **III**, 258; **20**, 326.
 — chemical history of, **III**, 412.
 — determination of the carbon, hydrogen, and nitrogen contained in, **20**, 333.
 — effects upon, of exposure to temperatures ranging from 50° to 60° C., **20**, 538.
 — effects upon, of exposure to 90° C., **20**, 437.
 — effects upon, of exposure to 100 C., **20**, 522.
 — effects of heat upon, **20**, 520.
 — explosive force of, **24**, 618.
 — exposure of, in different conditions to a heated atmosphere in a confined space, **20**, 561.
 — exposure of a large case of, to the sun's rays, **20**, 563.
 — exposure of large packages of, in different conditions, to heat, **20**, 561.
 — heat evolved in the formation of, **24**, 873.
 — hygroscopic moisture existing in, **20**, 327.
 — impregnation of, with substances capable of neutralising free acids, **20**, 543.

Gun-cotton, experiments on the increase sustained by cotton in its conversion into, **20**, 344.
 — conditions which determine the inflammability and explosive force of, **23**, 41.
 — manufacture and composition of, **20**, 310.
 — manufacture of, by Von Lenk's process, **20**, 317.
 — mineral constituents of, **20**, 327.
 — proportion of, dissolved by ether and alcohol, **20**, 327.
 — protective action of water on, **20**, 554.
 — relation between the carbonic acid and nitrogen obtained by oxidation of, **20**, 340.
 — reproduction of cotton from, **20**, 342.
 — spontaneous conversion of, into pectic and parapectic acids, **16**, 91.
 — spontaneous decomposition of, **13**, 76.
 — stability of, **20**, 505.
 — stability of, increased by long exposure to diffused daylight, **20**, 576.
 — stability of, as influenced by impurities, **20**, 530.
 — stability of, as influenced by special processes of preparation and preservation, **20**, 542.
 — storage of, under ordinary conditions of temperature, **20**, 559.
 — vegeto-alkali in, **III**, 287.
 Gun-cotton fibre, reduction of, to a fine state of division, **20**, 542.
 Gunpowder, conditions which determine the rapidity of explosion of, **23**, 43.
 — explosive force of, **24**, 644.
 — researches on the application of electricity from different sources, to the explosion of, **14**, 165.
 Gutta-percha, changes of, under tropical influence, **13**, 87.
 — decay of, **18**, 273.
 — dyeing of, with aniline colours, **24**, 971.
 — percolation of air through, **20**, 257.
 Gutta, pure, experiments on, **18**, 274.
 Gypsum, hydraulic properties of ignited, **25**, 268.
 Gypsum of Wasenweiler, **24**, 1180.

H.

Hæmatin, action of reducing agents on, **24**, 737.

- Hæmatin**, action of sulphuric acid on, **24**, 736.
- Hæmatin**, behaviour of, when treated with phosphorous chloride containing free phosphorus, **24**, 738.
- Hæmatin**, preparation of, from crystals of hæmin, **24**, 736.
- Hæmatolin**, **24**, 737.
- Hæmatoporphyrin**, **24**, 737.
- Hæmatoxylin**, **24**, 541.
- Hæmochromogen**, **24**, 738.
- Hæmoglobin**, compound of carbonic oxide with, **25**, 899.
- constitution of, **24**, 739.
- decomposition of, in absence of oxygen, **24**, 738.
- distribution of, in the living organism, **25**, 255.
- estimation of, **25**, 1030.
- influence of acids on the oxygen of, **25**, 312.
- presence of, in the muscles of molluscs, **25**, 255.
- Hair-dye**, **25**, 940.
- Haloïd** silver salts, chemical and mechanical alterations of, by light, **25**, 29.
- Halydria siliquosa*, mannite contained in, II, 138.
- Hamstead water**, analysis of, **4**, 378.
- Hard water**, objections to, for domestic use, **4**, 388, 392.
- Hardness of water**, determination of, I, 8 (p); **18**, 119.
- Hardness of water**, diminution of, by liming, **4**, 393.
- Hardness of water**, German scale of, **25**, 188.
- Hardness of water**, temporary and permanent, **4**, 381.
- Hardness of Chalk spring water**, **4**, 407.
- Hardness of Farnham and Surrey water**, **4**, 398.
- Hardness of Nile water**, **3**, 149.
- Hardness of Thames and Lea water**, averaged, **4**, 387.
- Hardness of the waters supplied by the eight principal London Companies**, determined by Clark's soap-test, **4**, 382.
- Harrogate waters**, chemical analysis of the, **7**, 161.
- Hay**, composition of, **25**, 840.
- composition and digestibility of the substance associated with cellulose in the fibre of, **24**, 576.
- meadow-, composition and digestibility of the fat of, **25**, 1036.
- percentage of fat and wax in, **24**, 1193.
- Heart**, comparative examination of the muscular substance of the, in cases of rapid death, with and without fever, **25**, 1104.
- Heat**, action of, on aniline sulphocyanate, **2**, 46.
- action of, on ferric hydrate, in presence of water, **14**, 64.
- action of, upon hydrate of ethylene-hexethyl-diphosphonium, **14**, 103.
- action of, on *α*-hydric nitrobenzoate, and on barytic nitrobenzoates, **19**, 369.
- action of, on meconate of ammonia, **6**, 72.
- action of, on menaphthoximide, **9**, 15.
- action of, on oxychloride of copper, **9**, 140.
- action of, on sycorin, **15**, 66.
- animal, source of, **21**, 47.
- atomic, **22**, 357.
- communication of, **24**, 1128.
- conduction of, in alloys, **20**, 213.
- conduction of, in gases, **24**, 298; **25**, 591.
- decomposition of silver nitrate by, **1**, 189.
- distribution of, in the spectrum, **25**, 968.
- effect of application of, to the roots of plants, **14**, 222.
- effects of, upon gun-cotton, **20**, 520.
- effects of, on fluids, **16**, 263.
- of the electric discharge, chemical effects produced by the, **25**, 211.
- Heat evolved by the chemical action of the solar rays**, **6**, 259.
- — in chemical actions produced by the electric current, **6**, 260.
- — in chemical combinations, I, 106.
- — in the combination of acids and bases, **6**, 246; **23**, 432.
- — in the combination of alcohols with bases, **24**, 976.
- — in the combination of metals with oxygen, chlorine, &c., **6**, 247.
- — in the combustion of cadmium, influence of crystallisation upon, **24**, 870.
- — in the combustion of lignites, **25**, 183.
- — in the combustion of magnesium, **24**, 643.
- — in the combustion of indium, cadmium, and zinc, **24**, 793.
- — in the condensation of gases by porous bodies, **6**, 251.
- — in certain phenomena of chemical decomposition, and in modifications by dimorphism, **6**, 238.
- — in the formation of ammonia, **6**, 250.
- — in the formation of aqueous solutions, **24**, 474.

- Heat evolved in the formation of nitrates, &c., criticism of the numbers calculated by Berthelot relating to the, **25**, 459.
- in the formation of various nitrogen compounds, **24**, 615.
- in the formation of the oxygen-acids of nitrogen, **25**, 781.
- in the formation of the oxygen-compounds of nitrogen, **25**, 593.
- in the formation of salts, **6**, 242.
- by friction of cast-iron, **3**, 326.
- by friction of mercury, **3**, 326.
- by friction of water, **3**, 319.
- in the hydration of sulphuric acid, **6**, 240.
- in rapid combustion, **6**, 234.
- in the reactions of metallic oxides, effects of calcination on, **24**, 869.
- by the solution of gases in water, **6**, 241.
- Heat evolved or absorbed by the sudden compression or expansion of various gases, **6**, 251.
- in the solution of sodium phosphate containing different quantities of water of crystallisation, **24**, 1131.
- Heat, expansion of alloys by, **20**, 206.
- expansion by, of salts in the solid state, **1**, 121.
- expansion of solids by, **25**, 780.
- influence of, on the evolution of oxygen by water-plants, **24**, 1080.
- mechanical equivalent of, **3**, 316.
- modification of electromotive force by, **25**, 379.
- quantities of, borrowed from the battery in the electrolysis of metallic salts, **25**, 112.
- researches on the quantities of, disengaged in chemical and molecular actions, **6**, 234.
- Heat, latent, of vapours, **1**, 27—39.
- Heat of neutralisation, **24**, 875.
- Heat of neutralisation of bases soluble in water, **24**, 473.
- Heat of solution of metallic oxides, alleged influence of calcination on the heat of, **25**, 217.
- Heat, specific, of carbon, **25**, 592.
- Heat, specific, of saline solutions, **24**, 468.
- Heat, specific, and conducting power, of building materials, **1**, 24 (p).
- Heat, specific and latent, of various bodies, **6**, 250.
- Heat - phenomena accompanying the transformation of nitrogen tetroxide into nitric acid, and the introduction of these bodies into organic compounds, **24**, 871.
- Heavy metals, relations of thallium to the, **17**, 126.
- Heavy spar, crystals of, from Vialas, **25**, 56.
- Heavy spar, manufacture and utilisation of artificial, **25**, 340.
- Hematite pig, analysis of, **25**, 537.
- Hemi-nate of barium, crystallisation of, **16**, 355.
- Hemipinic acid, **17**, 172; **5**, 265; **15**, 453.
- action of hydriodic acid on, **16**, 351.
- action of hydrochloric acid on, **16**, 354.
- action of hydrochloric and hydriodic acids on, **21**, 360.
- analyses of, **16**, 349.
- crystalline forms of, **24**, 361, 366.
- not acted on by nascent hydrogen, **16**, 355.
- normal, **16**, 361.
- Hemipovinic acid, **5**, 265.
- Hemp, Indian, products of the action of nitric acid on the resinous extract of, **22**, 417.
- Hen's egg, nuclear structures in the yolk of, **24**, 746.
- Heptachlorodimaphthalene, **25**, 65.
- Heptane, **25**, 1086.
- Heptyl acetate, **16**, 218.
- Heptyl alcohol, **16**, 218.
- Heptyl chloride, **16**, 426.
- monochlorinated, **16**, 427.
- Heptyl hydride from cannel-coal, **15**, 423.
- derivatives of, **16**, 216.
- formation of, by the action of baryta on azelaic acid, **17**, 261.
- normal, **25**, 1086.
- Heptyl iodide, **16**, 219.
- Heptyl sulphhydrate, **16**, 426.
- Heptylamine, **16**, 221.
- Heptylene, **16**, 219.
- Heptylene bromide, **16**, 220.
- Heracleum oil, hexyl alcohol from, **25**, 61.
- Herbaceous vegetables. See Vegetables.
- Herbivora, formation of hippuric acid in the urine of, **25**, 835.
- Herbs, medical, effects of exsiccation of, **4**, 159.
- Heron, guanine in the urine of, **24**, 848.
- Herrings, trimethylamine in the brine of salted, **5**, 288; **7**, 63.

- Heterogeneous liquids, determination of the weight of, **19**, 455.
- Heterogenite, **25**, 990.
- Heulandite from Elba, **25**, 991.
- Hexacetodulcitate, **25**, 400.
- Hexamidalbumin-sulphonic acid, **24**, 410.
- Hexane, **25**, 1085.
- Hexbenzodulcitate, **25**, 1093.
- Hexbromide of anthracene, **15**, 49.
- Hexbromide of silicon, **25**, 40.
- Hexchloride of silicon, **25**, 40.
- Hexchloride of tungsten, **25**, 286.
- Hexhydrophthalic acid, **24**, 373.
- Hexhydropyrene, **24**, 691.
- Hexiodide of amylbrucine, **24**, 400.
- Hexnitromannite, **17**, 159.
- Hexylene, **25**, 436.
- Hexphosphide of copper, **18**, 250.
- Hexyl acetate, **17**, 191.
- Hexyl alcohol, **15**, 461.
- from essential oil of Hera-cleum, **25**, 61.
- (β), formation of, **16**, 230.
- (β), products of the oxidation of, **16**, 307.
- (β), reactions of, **16**, 231.
- Hexyl aldehyde (β), **16**, 307.
- Hexyl chloride, **17**, 191.
- Hexyl ether (β), **16**, 233.
- Hexyl group, **16**, 221 ; **17**, 190.
- Hexyl hydride, **16**, 233.
- from cannel-coal, **15**, 422.
- formation of, by the action of baryta on suberic acid, **17**, 260.
- normal, **25**, 1085.
- Hexyl iodide, **17**, 190.
- Hexyl β-iodide, **16**, 223.
- Hexyl iodide, formation of, by the action of hydriodic acid on melampyrin, **15**, 459.
- Hexyl-mercaptan, **17**, 193.
- Hexyl-sulphuric acid, **16**, 232.
- Hexylene, **16**, 228.
- Hexylene, a new, **25**, 1087.
- β-Hexylene, oxidation of, **19**, 492.
- Hexylene bromide, **16**, 229.
- Hexylene hydride (dipropyl), formation of, from acetone, **25**, 409.
- Hibiscus esculentus*, ash-constituents of the seeds of, **24**, 429.
- Himalaya tea, **24**, 571.
- Hippuric acid, acetoxybenzamic acid an isomeride of, **13**, 235.
- composition of, **5**, 73.
- conversion of benzoic acid into, in the animal economy, **1**, 79.
- crystalline form of, **5**, 101.
- examination of certain products obtained from, **5**, 73.
- formation of nitride of benzoyl from, **7**, 191.
- Hippuric acid, formation of, in the urine of herbivora, **25**, 835.
- formulae of, **13**, 247.
- method of extracting, in considerable quantity, without evaporation of the urine, and some of its products of decomposition, **5**, 97.
- preparation of, **1**, 33 (p) ; **III**, 330 ; **5**, 75.
- researches on the physiological variations of the quantity of, in human urine, **17**, 55.
- simultaneous variations of, and of uric acid in healthy urine, **15**, 81.
- Hisingerite, **23**, 3.
- Hofmann's tyrosine reaction, **24**, 496.
- Homologous series, differences of boiling point in, **25**, 470.
- Honey, fermentation of, with yeast, **25**, 906.
- Hoop dialyser, **15**, 220.
- Hop-ash, analysis of, **III**, 392.
- Hops, amount of sugar in, **25**, 1111.
- nature and quantity of the elements removed from the soil by a crop of, **25**, 641.
- preservation of, **25**, 272.
- Horse, analysis of an earth-ball and intestinal calculus from a, **24**, 425.
- Horse-chestnut, existence of a second crystallisable fluorescent substance (pavlin) in its bark, **11**, 17.
- Horse-flesh, alkaloids obtained from, **3**, 314.
- Hot-blast, economy of, in iron-smelting, **22**, 234, 249—253.
- Human bile, putrefaction and analysis of, **14**, 127.
- Human economy, effect of change of climate on, **24**, 411.
- Human fat, composition of, **5**, 84.
- Human gall-stones, analysis of, **14**, 121.
- Human voidings, amount of nitrogen reckoned as ammonia, and estimated value of total constituents of, **19**, 96.
- Humate of ammonia, **24**, 749.
- Humic acid, **25**, 521.
- Humite, crystalline system of, **24**, 506 ; **25**, 53.
- Humite crystals, **25**, 294.
- Humus, absorption of ammonia from the air by, **25**, 917.
- Humus-substances, absorption of, by plants, **25**, 1036.
- Humus-substances of the soil, **25**, 521.
- Hybrids of ethylene-diphosphonium, **14**, 319.
- Hydracids, action of, on the quinino alkaloids, **24**, 931.

- Hydracids, compounds of, with duleite, **25**, 399.
- effect of, in destroying the fluorescence of a quinine solution, **22**, 176.
- thermal effects produced during the electrolysis of, **25**, 25.
- Hydrargethyl and hydrargomethyl, compounds of, **7**, 277.
- Hydrargochloride of lutidine, **5**, 54.
- Hydrargochloride of thebaine, **5**, 260.
- Hydrargyromethylum, **6**, 65.
- Hydrate of alumina soluble in water, **6**, 225.
- Hydrate of barium, action of boracic acid on, at a red heat, **14**, 147.
- Hydrate of barium, action of silicic acid upon, at a red heat, **14**, 150.
- Hydrate of ethylene-dipyridyl-diammonium, **14**, 164.
- Hydrate of ethylene-hexethyl-diphosphonium, action of heat upon, **14**, 103.
- Hydrate of ethylene-hexethyl-diphosphonium, reactions of, **14**, 93.
- Hydrate of ethylene-tetrethyl-phosphammonium, **14**, 330.
- Hydrate of meconin, normal, **16**, 361.
- Hydrate of the oil of laurel turpentine, **11**, 121.
- Hydrate of opianyl, **5**, 265.
- Hydrate of oxethyl-triethylphosphonium, **14**, 84.
- Hydrate of potassium, action of boracic acid on, at a red heat, **14**, 144.
- Hydrate of potassium, action of silicic acid on, at a red heat, **14**, 149.
- Hydrate of sodium, action of boracic acid on, at a red heat, **14**, 147.
- Hydrate of sodium, action of silicic acid on, at a red heat, **14**, 150.
- Hydrate of sodium binoxide, **14**, 229.
- Hydrate of thallium, **17**, 130.
- Hydrate of triethyl-sulphyl, **17**, 106.
- Hydrate of vinylated triethylphosphonium, **14**, 327.
- Hydrated calcio-aluminic phosphate from Cornwall, **18**, 263.
- Hydrated cerous phosphate from Cornwall, **18**, 259.
- Hydrated cuprico-aluminic sulphate, **19**, 130.
- Hydrated oxide of ethylene-sodium, **22**, 200.
- Hydrated oxide of silicon, **11**, 93.
- Hydrated oxide of tetramethylphosphonium, action of heat on, **11**, 74.
- Hydrated oxide of tetrethyl-phosphonium, **11**, 65.
- Hydrated oxide of triethyl-amyl-phosphonium, action of heat on, **11**, 72.
- Hydrated plumbo-cupric arsenate (baylodonite) from Cornwall, **18**, 265.
- Hydrated protoxide and suboxide of copper, their solubility in aqueous hyposulphite of soda, **16**, 29.
- Hydrates, researches on, **1**, 380.
- Hydrates, theory of aqueous solutions of, **11**, 183.
- Hydrates, crystallised, of baryta and strontia, **13**, 48.
- Hydrates of caputene, **14**, 65.
- Hydrates of ethylene oxide, **15**, 394.
- Hydrates of nitric acid, **11**, 399.
- Hydrates of perchloric acid, **16**, 82.
- Hydraulic lime, mixing of, **25**, 528.
- Hydraulic magnesium limestone, hardening of, **25**, 340.
- Hydraulic power of mortars and cements, origin of the, **25**, 528.
- Hydrazophenylene, **25**, 695.
- Hydrazulmoxin, **25**, 250.
- Hydric nitrobenzoates, **19**, 364.
- Hydride of acetosalicyl, **21**, 181.
- Hydride of amyl from camel coal, **15**, 421.
- Hydride of benzoyl, action of acetic anhydride on, **20**, 589.
- Hydride of benzoyl, formation of, **9**, 266.
- Hydride of benzyl-salicyl, **21**, 123.
- Hydride of butyl in American petroleum, **18**, 60.
- Hydride of butyro-salicyl and butyric coumaric acid, **21**, 472.
- — — formation of butyric coumarin from, **21**, 474.
- Hydride of diamyl, **16**, 428.
- Hydride of ethyl, identity of, with methyl, **17**, 262.
- Hydride of ethyl-bromosalicyl, **20**, 425.
- Hydride of ethyl-salicyl, **20**, 422.
- — — action of acetic anhydride on, **20**, 588.
- — — action of ammonia on, **20**, 425.
- — — action of bromine on, **20**, 424.
- — — action of nitric acid on, **20**, 428.
- — — compound of, with bisulphite of ammonium, **20**, 424.
- — — compound of, with bisulphite of sodium, **20**, 423.
- Hydride of heptyl (oenanthyl), derivatives of, **16**, 216.
- — — formation of, by the action of baryta on azelaic acid, **17**, 261.
- — — from camel coal, **15**, 423.
- Hydride of hexyl, **16**, 233.
- — — from camel coal, **15**, 422.
- — — formation of, by the action of baryta on suberic acid, **17**, 260.

- Hydride of methyl-bromosalicyl, **20**, 421.
- Hydride of methyl-salicyl, **20**, 418.
- action of acetic anhydride on, **20**, 589.
- action of ammonia on, **20**, 421.
- action of bromine on, **20**, 420.
- action of nitric acid on, **20**, 422.
- compounds of, with alkaline bisulphites, **20**, 420.
- Hydride of nitro-ethylsalicyl, **20**, 429.
- Hydride of octyl (capryl) from cannell coal, **15**, 425.
- Hydride of phenyl, **7**, 242.
- Hydride of salicyl, absorption of its vapour by charcoal, **21**, 188.
- derivatives of, **20**, 418.
- Hydride of sodium-salicyl, action of benzyl chloride on, **21**, 122.
- action of ethyl iodide on, **20**, 422.
- action of methyl iodide on, **20**, 418.
- Hydrides of the alcohol-radicles existing in the products of the distillation of cannell coal, **15**, 419.
- Hydrides of organic radicles, probable existence of, in coal-gas, **3**, 42.
- Hydrides of ethyl and propyl in American petroleum, **18**, 56.
- Hydrides of salicyl, ethyl-salicyl, &c., action of acetic anhydride on, **20**, 586.
- Hydriodates. See Hydriodides.
- Hydriodic acid, action of, on benzylated anisol, **25**, 703.
- action of, on codeine in presence of phosphorus, **25**, 150.
- action of, on cotarnine, **16**, 358.
- action of, on diazo-anido-benzoic acid, **18**, 305.
- action of, on erythromannite, **15**, 461.
- action of, on glycerin, **8**, 192.
- action of, on glyoxylates, **18**, 199.
- action of, on hemipinic acid, **16**, 351; **21**, 360.
- action of, on iodo-substitution-compounds, **17**, 206.
- action of, on meconin, **16**, 350; **21**, 360.
- action of, on mclampyrin, **15**, 458.
- action of, on narcotine, **21**, 363.
- action of, on nitrite of amyl, **19**, 339.
- Hydriodic acid, action of, on opianic acid, **16**, 347; **21**, 358.
- action of, on polyatomic acids, **17**, 209.
- action of sodium-amalgam on, in presence of acetic ether, **16**, 423.
- aqueous, of constant boiling point, composition of, **13**, 160.
- formation of the crystalline compound of, with phosphoretted hydrogen, **10**, 210.
- preparation of, **3**, 74.
- reactions of, **20**, 166.
- reaction of, with nitrite of amyl, **20**, 578.
- reduction of glutanic acid by, **25**, 815.
- specific gravity of aqueous, **24**, 655.
- Hydriodic acid and phosphorus, action of, on diapo-tetramorphine, **25**, 656.
- Hydriodide of amylpiperidine, **6**, 181.
- Hydriodide of berberine, **15**, 351.
- Hydriodide of biniodoberberine, **15**, 352.
- Hydriodide of cajputene, **14**, 69.
- Hydriodide of codeine, **4**, 113.
- Hydriodide of cyaniline, **1**, 166.
- Hydriodide of lophine, **9**, 223.
- Hydriodide of piperidine, **6**, 177.
- Hydro-acridine, **24**, 711.
- Hydro-acridine, insoluble, **24**, 712.
- Hydro-amido-tetrazoresorufin hydrochloride, **24**, 831.
- Hydrobenzoin, **24**, 384.
- Hydrobilirubin, **25**, 638.
- Hydrobromates. See Hydrobromides.
- Hydrobromic acid, action of, on citric acid, **24**, 1047.
- action of, on codeine, **25**, 152.
- action of, on oxide of triethylphosphine, **24**, 637.
- action of, on polyatomic acids, **17**, 203.
- aqueous, of constant boiling point, composition of, **13**, 157.
- diffusion of, **4**, 86.
- preparation of, **3**, 74.
- reaction of, with nitrite of amyl, **20**, 578.
- specific gravity of aqueous, **24**, 486.
- Hydrobromide of berberine, **15**, 350.
- Hydrobromide of cyaniline, **1**, 166.
- Hydrobromide of diethylaniline, **3**, 288.
- Hydrobromide of ethylaniline, **3**, 286.
- Hydrobromide of menaphthalamine, **9**, 11.
- Hydrobromide of tribromocodeine, **4**, 118.

- Hydrocarbon, C_7H_{14} , and its derivatives, **24**, 1027.
- Hydrocarbon, propylene, a new, of the series C_nH_m , **3**, 111.
- Hydrocarbon and stearoptene of *Ptychotis Ajowan*, **9**, 235.
- Hydrocarbons, chemistry of, **25**, 425.
- chemical structure of some non-saturated, **24**, 214.
- conversion of, into other hydrocarbons of greater complexity, **17**, 42.
- formation of, **24**, 895.
- heat disengaged in combustion of, **6**, 236.
- Hydrocarbons of the acetylene series, **25**, 435.
- Hydrocarbons, aromatic, **25**, 437.
- and their derivatives, refraction equivalents of the, **23**, 147.
- formation of phenols from, **25**, 481.
- products of oxidation of, **25**, 619.
- new series of, **24**, 508, 688.
- Hydrocarbons, aromatic, having lateral chains, oxidation of, **25**, 816.
- Hydrocarbons contained in crude benzol, **19**, 356.
- Hydrocarbons of the benzene-series, products of the action of dilute nitric acid on, **14**, 54.
- Hydrocarbons produced by the destructive distillation of Boghead coal, **15**, 130.
- Hydrocarbons produced by distillation of caoutchouc, relation between the first and second, **15**, 116.
- Hydrocarbons, condensed, synthesis of, **25**, 681.
- Hydrocarbons from essential oils, **17**, 17; **25**, 3.
- Hydrocarbons, luminiferous, igniting points of, **16**, 399.
- Hydrocarbons from Pechelbrom petroleum, **25**, 886.
- Hydrocarbons of the series C_nH_{2n+2} , production of, in alcoholic fermentation, **25**, 574.
- Hydrocarbons of the series C_nH_{2n+2} , researches on, **24**, 896.
- Hydrocarbons of the series C_nH_{2n-4} , **25**, 436.
- Hydrochlorates. See Hydrochlorides.
- Hydrochloric acid, absorption of, in water, **12**, 128.
- action of, upon a mixture of acetone and alcohol, **7**, 246.
- action of, on alloys of copper and tin, **19**, 452.
- action of, on alloys of copper and zinc, **19**, 442, 445.
- Hydrochloric acid, action of arsenic upon, **24**, 661.
- action of, on codeine, **25**, 152.
- action of, on cotarnine, **16**, 356.
- action of, on cyanide of ethylene, **15**, 137.
- action of, on diapo-tetramorphine, **25**, 655.
- action of, on hemipinic acid, **16**, 354; **21**, 360.
- action of, on meconin, **16**, 350; **21**, 360.
- action of, on narcotine, **21**, 363.
- action of, on some native combinations of oxide of mercury with oxide of antimony, **12**, 29.
- action of, on opianic acid, **16**, 346; **21**, 358.
- action of, on ossein, **24**, 733.
- action of, on oxide of triethylphosphine, **24**, 635.
- action of, on sulphide of mercury in presence of certain other substances, **12**, 158.
- capillary transpiration of, **15**, 436.
- combination of, with pepper-mint-camphor, **15**, 27.
- detection of, in cases of poisoning, **25**, 87.
- diffusion of, **4**, 84; **15**, 227.
- electric spectra of metals in, **17**, 87.
- estimation of, **1**, 66.
- method of demonstrating the composition of, **18**, 157.
- osmose of, **8**, 58.
- passage of, through heated platinum, **20**, 261.
- preparation of, **1**, 7 (p).
- preparation of pure, from the impure fuming acid, **25**, 979.
- preparation of thallium from commercial, **17**, 119.
- reaction of, with nitrite of amyl, **20**, 577.
- solubility of barium sulphate in, **9**, 15.
- solubility of lead sulphate in, **15**, 59.
- specific heat, density, and expansion of, **24**, 95.
- Hydrochloric acid, aqueous, of constant boiling point, composition of, **13**, 156.
- density of, **11**, 169.
- density and expansibility of, **24**, 1127.
- Hydrochloric ether: absorption of its vapour by charcoal, **20**, 164.

- Hydrochloride of biamidobenzoic acid, **9**, 272.
- Hydrochloride of capputene, **14**, 68.
- Hydrochloride of chlorocodine, **4**, 119.
- Hydrochloride of codeine, **4**, 113.
- Hydrochloride of cyaniline, **1**, 161.
- Hydrochloride of diaminylamine, **4**, 323.
- Hydrochloride of dinitromelamine, **1**, 307.
- Hydrochloride of dipyrindine, **22**, 411.
- Hydrochloride of ethylamine, **3**, 95.
- Hydrochloride of ethylpiperidine, **6**, 180.
- Hydrochloride of lophine, **9**, 223.
- Hydrochloride of menaphthalamine, **9**, 10.
- Hydrochloride of methylamine, **3**, 94.
- Hydrochloride of morphine, diffusion of, **4**, 104.
- Hydrochloride of narceine, **5**, 259.
- Hydrochloride of naphthylamine, **12**, 154.
- Hydrochloride of nitraniline, **8**, 176.
- Hydrochloride of nitrocodeine, **4**, 116.
- Hydrochloride of piperidine, **6**, 176.
- Hydrochloride of sincaline and gold, **6**, 190.
- Hydrochloride of sincaline and platinum, **6**, 190.
- Hydrochloride of triaminylamine, **4**, 323.
- Hydrochloride of tribromocodine, **4**, 118.
- Hydrochloride of triethyl-sulphyl, **17**, 108.
- Hydrochrysammide, **19**, 324.
- Hydrocotarnine, **24**, 1065; **25**, 724.
- Hydrocyanaldine, **7**, 275.
- Hydrocyanates. See Hydrocyanides.
- Hydrocyanic acid, action of chlorine and bromine on an alcoholic solution of, **25**, 411.
- action of chlorine on, in alcoholic solution, **24**, 136.
- compound of titanium dichloride with, **3**, 178.
- determination of the amount of, in medicinal prussic acid, bitter-almond water, and laurel water, **4**, 219.
- diffusion of, **4**, 86.
- preparation of, **1**, 96.
- reaction of, with chloral and crotonic chloral, **25**, 485.
- ready liberation of, from nitrobenzene, dinitrobenzene, and similar compounds, **25**, 193.
- thermal effects produced in the formation and decomposition of, **24**, 982.
- aqueous, formation of urea by decomposition of, **24**, 1167.
- Hydro-diazo-resorufin hydrochloride, **24**, 830.
- Hydro-dinitroazobenzene, **25**, 593.
- Hydro-electric currents generated by couples formed of a single metal, **8**, 295.
- Hydro-electric currents, thermic coefficients of, **25**, 115.
- Hydro-electric forces, measurement of, **24**, 101.
- Hydro electric machine, Armstrong's, use of, for exploding gunpowder, **14**, 176.
- Hydroethylsalicylamide, **20**, 426.
- Hydroferrocyanic and hydroterricyanic acids, combination of quinine and cinchonine with, **1**, 407.
- Hydrofluoric acid, **22**, 368.
- — electrolysis of, **22**, 387.
- — estimation of free, **24**, 854.
- — general chemical behaviour of, **22**, 392.
- — molecular volume of, in the gaseous state, **22**, 377.
- — preparation of, **22**, 369.
- — specific gravity of, **22**, 384.
- Hydrofluoric acid, anhydrous, analysis of, **22**, 374.
- Hydrofluoric acid, aqueous, **22**, 397.
- Hydrofluoric acid, aqueous, of constant boiling point, composition of, **13**, 162.
- Hydrogel of silicic acid, **17**, 321.
- Hydrogen absorbed by palladium, reducing action of, **25**, 231.
- absorption and retention of, by platinum, **20**, 268.
- action of chromic acid on, **25**, 590.
- action of electric discharge on, **13**, 361.
- action of, on iron oxide, **24**, 103.
- action of, on nitric acid, **24**, 885.
- action of, on organic polycyanides, **17**, 362.
- affinity of, for chlorine, oxygen, and nitrogen, **25**, 215.
- combination of, with aromatic hydrocarbons, **25**, 440.
- new class of compounds in which it is replaced by nitrogen, **20**, 36.
- decrease in chemical activity of, in the reduction of ferrous-feric oxide by admixture with foreign gases, **25**, 281.
- determination of, in gun-cotton, **20**, 336.
- diffusion-velocity of, **16**, 400.
- effect of heating sulphate and sulphide of lead in, **16**, 42, 46.
- electric spectra of metals in, **17**, 81.
- evolution of, in alcoholic fermentation, **25**, 572.
- evolved from decomposing organic

- matter, experiments to determine whether it combines with gaseous nitrogen, **16**, 168.
- Hydrogen, igniting point of, **16**, 399.
- iron reduced by, **25**, 676.
- method of effecting the substitution of chlorine for, in organic compounds, **15**, 41.
- organic compounds in which it is replaced by nitrogen, **19**, 57.
- palladium saturated with, at high temperatures, **22**, 431.
- passage of, through red-hot platinum, **20**, 259.
- preparation of, **24**, 164.
- reduction of silver chloride and iodide by, **24**, 1009.
- relation of, to palladium, **22**, 419.
- spectrum of, at low pressures, **25**, 383.
- symbol of, in Brodie's chemical calculus, **21**, 405.
- use of, in determining vapour-densities, **6**, 205.
- Hydrogen and ammonia, absorption of, in water, **17**, 98.
- Hydrogen in ammonia, its elimination by the action of the bromides, chlorides and iodides of the alcohol-radicals, **11**, 278—287.
- Hydrogen in ammonia, its elimination by the action of oxygen-compounds of organic radicals, **11**, 287.
- Hydrogen and ethyl, compounds obtained by the action of anhydrous sulphuric acid on the chlorides of, **10**, 97.
- Hydrogen, carbon dioxide, and hydrogen sulphide, analysis of mixtures of, **25**, 919.
- Hydrogen and carbon monoxide, analysis of mixtures of, **25**, 919.
- Hydrogen and oxygen, diffusion of, into a vacuum, **17**, 350.
- Hydrogen bromide, action of, on nitronaphthalene, **25**, 136.
- Hydrogen carbides, their behaviour with magnesium, **20**, 130.
- Hydrogen chloride, gaseous, analysis of, by means of iron, **24**, 156.
- Hydrogen dioxide, action of oxides, metals, and charcoal on, **11**, 358.
- — action of potassium permanganate on water charged with, under the influence of a freezing mixture, **25**, 921.
- — decomposition of chromic acid by, **16**, 326.
- — decomposition of a solution of, by ferricyanide of potassium, **16**, 322.
- Hydrogen dioxide, decomposition of, by solution of barium hypochlorite, **16**, 324.
- — decomposition of, by solution of permanganic acid, **16**, 320.
- — effect of state of surface on the rate of decomposition of, **22**, 145.
- — estimation of, by solution of indigo, **25**, 922.
- — formation of, in combustion and in vital processes, **25**, 35.
- — oxidation effected by, **16**, 333.
- Hydrogen dioxide and carbolic acid, reducing action of, **24**, 356.
- Hydrogen dioxide and hydrogen iodide, reaction of, **20**, 476.
- Hydrogen dioxide and ozone, occurrence of, in the electrolysis of sulphuric acid, **7**, 251.
- Hydrogen, nascent, action of, on azodinaphthylidiamine, **18**, 173.
- — action of, on bitter almond oil, **24**, 384.
- — action of, on nitrite of amyl, **11**, 247.
- — action of, on oxalic acid, **16**, 301.
- — action of, on succinic acid, **16**, 304.
- Hydrogen permanganate and hydrogen oxalate, reaction of, **20**, 462.
- Hydrogen phosphoretted, preparation of pure, **24**, 305.
- Hydrogen silicide, composition of, **25**, 155.
- Hydrogen and silicon, bromide of, **11**, 93.
- Hydrogen and silicon, chloride of, **11**, 91.
- Hydrogen and silicon, iodide of, **11**, 93.
- Hydrogen sulphide, absorption of, in gas analysis, **25**, 918.
- — application of, to analysis in the dry way, **25**, 841.
- — containing arsenic, **24**, 889.
- — description of an apparatus for generating, **17**, 152.
- — a mode of employing, in chemical analysis, **2**, 92.
- — estimation of, in presence of carbon dioxide, **24**, 582.
- — reduction of sulphuric acid to, by hydrogen in the nascent state, **25**, 786.
- — separation of sulphur from, **25**, 1129.
- — temperature of decomposition of, **24**, 889.
- Hydrogen sulphide and carbon dioxide, analysis of mixtures of, **25**, 918.
- Hydrogen sulphide and sulphurous acid, volumetric determination of, **8**, 227.

- Hydrogen sulphuretted. See Hydrogen Sulphide.
- Hydrogen, typical, volumetric estimation in ammonia-bases, **24**, 957.
- Hydrogenium, atomic volume of, **22**, 428.
- chemical properties of, **22**, 432.
- density of, **22**, 419.
- electrical conductivity of, **22**, 429.
- magnetism of, **22**, 430.
- tenacity of, **22**, 429.
- Hydro-isonaphthamide, **25**, 699.
- Hydromellitic acid, products obtained by heating, with sulphuric acid, **24**, 372.
- Hydrometer for saccharine liquids, **25**, 976.
- Hydrometer and saccharometer, mode of reducing the indications of the, to each other, **1**, 16 (p).
- Hydrometry and the German scale of hardness, **25**, 88.
- Hydropiperate of ammonium, **15**, 21.
- Hydropiperate of barium, **15**, 23.
- Hydropiperate of calcium, **15**, 22.
- Hydropiperate of ethyl, **15**, 23.
- Hydropiperate of potassium, **15**, 21.
- Hydropiperate of silver, **15**, 23.
- Hydropiperoin, action of acetyl chloride on, **24**, 934.
- Hydropiperoin, action of nitric acid on, **24**, 935.
- Hydroplatino-bisulphocyanic acid, **7**, 35.
- Hydroplatino-tersulphocyanic acid, **7**, 30.
- Hydropyromellitic acid, products of distillation of, **24**, 373.
- Hydroquinone, red phthalin formed by heating, with phthalic and sulphuric acids, **24**, 911.
- Hydroselenocyanic acid, **4**, 18.
- Hydrosol of silicic acid, **17**, 321.
- Hydrosorbic acid, **25**, 486.
- Hydrosulphate of ammonia, action of, on freshly precipitated sulphide of copper, **18**, 94.
- Hydrosulphate of ammonia, action of, on mononitranisol, binitranisol and trinitranisol, **3**, 75, 76.
- Hydrosulphate of mustard-oil, compounds of, **8**, 183.
- Hydrosulphates, metallic, compounds of, with mustard oil, **8**, 183.
- Hydrosulphocyanate of codeine, **4**, 114.
- Hydrosulphocyanic, hydroferrocyanic and hydroferricyanic acids, researches on the combinations of several organic bases with, **1**, 405.
- Hydrosulphuric acid, passage of, through heated platinum, **20**, 262.
- Hydrothymoquinone, **24**, 351.
- Hydrotimeter, water-analysis with the, **24**, 582.
- Hydroxylamine, benzoyl-derivatives of, **25**, 414.
- Hydroxylamine, hydrochlorides of, **25**, 37.
- Hydrozincite of Auronzo, **24**, 893.
- Hydruets. See Hydrides.
- Hyoscine, **24**, 149.
- Hyoscimic acid, **24**, 149.
- Hyoseyamine, preparation and composition of, **24**, 149.
- Hyoscyamus niger*, ash-analysis of the seed of, **25**, 263.
- Hypersthene, identity of amblystegite with, **24**, 1179.
- iridescent lamina in, **24**, 1174.
- Hypersthenite, zircon in, **24**, 205.
- Hypobromite of sodium, estimation of urea by means of, **24**, 162.
- Hypobromous acid, **15**, 477.
- Hypobromous anhydride, attempt to prepare, **15**, 485.
- Hypochloric acid, preparation of, **11**, 193.
- Hypochlorite, **25**, 132.
- Hypochlorite of barium, decomposition of a solution of peroxide of hydrogen by, **16**, 324.
- Hypochlorites and chlorites, volumetric determination of, **8**, 226.
- Hypochlorous anhydride, absorption spectrum of, **25**, 382.
- Hypogaic acid, a fatty acid obtained from earth-nut oil, **8**, 280.
- Hypogaic ether, **8**, 281.
- Hypogallie acid, **16**, 351.
- Hyponitric acid, action of, on aqueous solutions of bromine and chlorine, **III**, 143.
- relation of ozone to, **III**, 2.
- Hypophosphites, **25**, 787.
- Hyposulphamylate of barium, **3**, 159.
- Hyposulphamylie acid, **1**, 375.
- identity of, with bisulphamylie acid, **3**, 158.
- Hyposulphate of thallium, **25**, 987.
- Hyposulphethylic acid, identity of, with bisulphethylic acid, **3**, 18.
- preparation of, **3**, 20.
- Hyposulphethylic and hyposulphimethylic acids, produced by the action of nitric acid upon the sulphocyanates and bisulphides of ethyl and methyl, **1**, 45.
- Hyposulphimethylic acid, identity of, with bisulphimethylic acid, **3**, 18.
- Hyposulphimethylic acid, preparation of, **3**, 22.
- Hyposulphite of berberine and silver, **15**, 347.
- Hyposulphite of sodium, solvent power

- exercised by a solution of, upon many salts insoluble in water, **16**, 28.
 Hyposulphite of thallium, **17**, 136.
 Hyposulphite and sulphantimonate of sodium, compound of, **25**, 42.
 Hyposulphites, composition of, **23**, 424.
 Hyposulphites, process for the determination of sulphides, sulphites, hypsulphites, and sulphates, in presence of each other, as adopted in the determination of these salts in soda-waste obtained from black ash, **11**, 166.
 Hyposulphuric chloride, action of phosphorous chloride on, **25**, 222.
 Hyposulphurous acid, constitution of, **22**, 178, 180, 254.
 ——— synthesis of, **20**, 291.
 Hypoxanthine, occurrence of, in normal bone-marrow, **25**, 1106.
 ——— reaction of, with silver nitrate and gelatin, **25**, 257.
 Hyssop-oil, analysis of, **1**, 46.

I.

- Ice, colloidal characters of, **15**, 268.
 ——— fabrication of, by means of methylic ether, **25**, 532.
 ——— found under the surface of the water in rivers, called "ground ice," **14**, 111; **15**, 88.
 Ice calorimeter, **24**, 180, 643.
 Idiotypes and isotypes, definition of, **13**, 35.
 Idocrase from Arendal, **25**, 56.
 Idocrase, garnet, &c., experiments on the density of, **17**, 386.
 Idrialene, **25**, 445.
 Igasurine, **24**, 400.
 Igniting point of coal-gas, **16**, 398.
 Igniting points of bisulphide of carbon, carbonic oxide, hydrogen, light carburetted hydrogen, and olefiant gas, **16**, 399.
Ilex Paraguayensis, separation of theine from, **1**, 48 (p).
 Illuminating gas from Bohemian lignite, **25**, 1138.
 Illuminating gas, composition of permanent, obtained from the decomposition of petroleum naphtha, **24**, 864.
 Ilnenium (?), compounds of, **24**, 807; **25**, 294.
 Iseumannite, a native molybdenum salt, **24**, 1173.
 Ivaite of Nassau, **24**, 1180.
 Imidogen-bases, **3**, 96.
 ——— table of, **4**, 326.
 Inactive liquids and metals, electro-

- motive force developed by the contact of, **25**, 662.
 Incineration of animal and vegetable substances, **24**, 855.
 Incineration of the fixed residue of waters, **18**, 119.
 India, examination of vegetable products from, **9**, 226.
 India, Western, analysis of a cobalt-ore found in, **11**, 39.
 Indian geranium, oil of, **17**, 10; **25**, 12.
 Indian hemp, products of the action of nitric acid on the resinous extract of, **22**, 417.
 India-rubber, oxidation of, **18**, 44, 280.
 Indigo, formation of anthranilic acid from, **19**, 470.
 ——— metamorphoses of, **11**, 266.
 ——— oxidation of, by nitric acid in contact with alumina, **11**, 354.
 ——— products derived from, **19**, 462.
 ——— relation between specific gravity and colouring power of, **25**, 251.
 ——— solvents for, **25**, 271.
 ——— union of, with cotton-fibre, **16**, 5.
 ——— valuation of, **5**, 297.
 Indigo-solution, application of, to the estimation of nitrates, nitrites, and hydrogen dioxide, **25**, 922.
 Indigo sulphate and arsenious acid, comparative action of ozone upon, **25**, 979.
 Indigotin, or blue colouring matter of indigo, estimation of, **18**, 217.
 ——— preparation of crystallised, by means of phenol, **25**, 250.
 ——— solvents for, **24**, 268, 568.
 Indisine, **14**, 232.
 Indium, **24**, 664.
 ——— atomic weight of, **24**, 182.
 ——— heat of combustion of, **24**, 793.
 ——— specific heat of, **24**, 182.
 Indol, **25**, 709.
 Indophan, **25**, 251.
 Induction, electromotive force of, in liquid conductors, **24**, 651.
 Induction-spark, constitution of the, **25**, 117.
 Indulin blue, **25**, 855.
 Industrial culture, statics of, **25**, 641.
 Inflammability of ammonia, how to exhibit the, **13**, 78.
 Infusions, vegetable, action of oxygen on, **25**, 640.
 Infusorial earth, applications of, **25**, 940.
 Infusorial silica, uses of, **24**, 764.
 Ink-spots, removal of, from coloured fabrics, **25**, 1142.
 Inorganic constituents, utilisation of certain, in the animal body, **24**, 1072.

- Inorganic and organic compounds, notation of, **19**, 372.
- Inosite, occurrence of, in the lungs of the porpoise, **24**, 126.
- its occurrence in the vegetable kingdom and convertibility into paralactic acid, **25**, 315.
- Insolimates, **9**, 210—219.
- Insolinic acid, **9**, 210.
- — conversion of the cymole from turpentine and caoutchou into, **15**, 121.
- Insoluble substances, examination of, for alkalis, **18**, 229.
- Intestinal calculus from a horse, **24**, 425.
- Inulin, conversion of cane-sugar into a substance isomeric with, **11**, 384.
- reaction of, with acetic anhydride, **25**, 68.
- Inuloid, a soluble modification of inulin, **24**, 348.
- Inverse formation in the tetryl series, **25**, 478.
- Invertebrata, connective tissue of, **25**, 633.
- occurrence of gelatigenous tissues in, **24**, 849.
- Invertebrate animal, iron in the blood of an, **25**, 899.
- Invisible photographic image, **25**, 31.
- Iodacetamide, **24**, 150.
- Iodaniline, action of carbon disulphide on, **25**, 511.
- preparation of, **1**, 272.
- Iodate of calcium in sea-water, **25**, 597.
- Iodate of potassium, oxidising power of, **25**, 1074.
- Iodate of thallium, **25**, 987.
- Iodated phenylic mustard-oil, **25**, 510.
- Iodates, ferric, **24**, 108.
- Iodethylene-propionic acid, products obtained by boiling, with milk of lime, **24**, 362.
- Iodic acid, volumetric estimation of, **8**, 232.
- Iodide of allyl, **10**, 317.
- Iodide of ammonia, **16**, 240.
- Iodide of amyl: absorption of its vapour by charcoal, **21**, 189.
- — action of, on amylamine and on ammonia, **4**, 324.
- — action of, on potassium-alcohol, **4**, 108.
- — action of sodium-amalgam on, in presence of acetic ether, **16**, 420.
- — action of, on triethylamine, **4**, 313.
- — normal, **24**, 1034.
- Iodide of amylotriethylammonium, **4**, 314.
- Iodide of arsenbiethyl, **7**, 262.
- Iodide of arsenethylum, **7**, 267.
- Iodide of arsentriethyl, **7**, 265.
- Iodide of butyl, action of mercuric cyanide and of zinc-ethyl on, **25**, 1092.
- Iodide of capryl, **7**, 288.
- Iodide of cyanogen, heat evolved in the formation of, **24**, 985.
- Iodide of ethyl, **13**, 69.
- — absorption of its vapour by charcoal, **21**, 188.
- — action of, on diethylaniline, **4**, 318.
- — action of, on potassium alcohol, **4**, 106.
- — action of sodium-amalgam on, in presence of acetic ether, **16**, 418.
- — action of solar light on, **3**, 322.
- — action of, on sparteine and ethyl-sparteine, **15**, 5.
- — action of tin upon, **6**, 58.
- — action of, on toluidine, **7**, 68.
- — action of, on triethylamine, **4**, 304.
- — action of, on tyrosine, **22**, 291.
- Iodide of ethylene, action of, on acetylide of copper, **24**, 903.
- Iodide of heptyl, **16**, 219.
- Iodide of hexyl, **8**, **16**, 223.
- Iodide of hexyl obtained by the action of hydriodic acid on melampyrin, **15**, 459.
- Iodide of hydrogen, reaction of, with hydrogen dioxide, **20**, 476.
- Iodide of iodammonium, **16**, 239.
- Iodide of isopropyl. See Isopropylie Iodide.
- Iodide of lead, action of, on some metallic acetates, **25**, 242.
- Iodide of lead and red iodide of mercury: their solubility in aqueous hyposulphite of soda, **16**, 29.
- Iodide of mercury, compounds of, with the alkaloïds, **11**, 97.
- Iodide of methyl, action of ammonia on, **4**, 320.
- — action of, on aniline, **3**, 295.
- — action of, on diethylaniline, **4**, 316.
- — action of, on ethylamine, **4**, 319.
- — action of, on ethylaniline, **3**, 296.
- — action of mercury upon, **6**, 65.
- — action of, on potassium-alcohol, **4**, 107.
- — action of sodium amalgam on, in presence of acetic ether, **16**, 416.
- — action of, on triethylamine, **4**, 312.

Iodide of methyl, action of zinc upon, **6**, 62.

— — — mixed with ether, action of sodium upon, **13**, 140.

Iodide of methylethylamylphenylammonium, **4**, 319.

Iodide of methyl-diethylamylammonium, **4**, 316.

Iodide of methyl-plumbethyl, **7**, 270.

Iodide of methyl-quinine, **7**, 279.

Iodide of methyl-strychnine, oxidation of, **21**, 164.

Iodide of methyltriethylammonium, **4**, 313.

Iodide of methyltriethylphosphonium, **11**, 71.

Iodide of nitrogen, **4**, 34.

— — — constitution of, **6**, 90.

— — — explosion of, **23**, 45.

Iodide and chloride of nitrogen, so-called, **7**, 51.

Iodide of oxethyl-triethylphosphonium, **14**, 83.

Iodide of phenyl, **7**, 243.

Iodide of phosphorus, action of, on glycerin, **8**, 145.

Iodide, potassio-thallie, **25**, 988.

Iodide of potassium, action of light upon, **20**, 10.

— — — action of mercuric oxide on, **25**, 987.

— — — curious form of crystallisation of, **5**, 136.

— — — diffusion of, **4**, 99.

— — — manufacture of, from the mother-liquors of kelp, **25**, 1130.

— — — reaction of, with cupric sulphate, **24**, 581.

— — — starch-paper soaked in, a test for ozone, **20**, 1.

Iodide of propyl, normal, **24**, 1032.

Iodide of selenethyl, **7**, 95.

Iodide of silver, **10**, 241.

— — — decomposition of, **24**, 313.

— — — reduction of, by hydrogen, **24**, 1009.

— — — refraction and dispersion of light in, **24**, 603.

Iodide of sodium, compound of, with cane-sugar, **24**, 272.

— — — diffusion of, **4**, 100.

Iodide of sparteine, **15**, 3.

Iodide of stannethylium, **6**, 59.

Iodide of starch, **25**, 299, 687.

Iodide of stibethyl, **5**, 70.

— — — action of ammonia upon, **9**, 278.

— — — action of stibethyl upon, **9**, 278.

Iodide of stibmethylethylum, **5**, 68.

Iodide of stibmethylum, **5**, 68.

Iodide of stibtriamyl, **9**, 284.

Iodide of stibtriethyl, **9**, 280.

Iodide of tellurethyl, **6**, 42.

Iodide of tetrallyl-arsonium, **10**, 327.

Iodide of tetramethylammonium, **4**, 321.

Iodide of tetramethylphosphonium, **11**, 74.

Iodide of tetramylammonium, **4**, 123.

Iodide of tetroethylphosphonium, **11**, 64.

Iodide of tetroethyl-phosphonium, crystalline form of, **14**, 169.

Iodide of thallium, **17**, 137.

Iodide of triethylamylphosphonium, **11**, 71.

Iodide of triethylphosphine, **11**, 69.

Iodide of triethyl-sulphyl, **17**, 105.

Iodide of trimethylamylphosphonium, **11**, 75.

Iodide of trimethylethylphosphonium, **11**, 75.

Iodide of tungsten, **25**, 287.

Iodide of zinc, compound of, with diiodide of ethylene-hexethyl-diphosphonium, **14**, 102.

— — — compound of, with oxide of triethylphosphine, **13**, 296.

Iodide of zinc and sparteine, **15**, 4.

Iodides, action of ether on, **25**, 923.

— — — Price's test for, **4**, 155.

— — — volumes of, in solution and in the solid state, **11**, 440.

Iodides of the alcohol-radicals: their formation from Boghead naphtha, **15**, 359.

Iodides, amylic, ethylic, methylic, etc. See Amylic, Ethylic, Methylic Iodide, etc.

Iodides of hydrogen and the alkali-metals, precipitation of dilute silver solutions by the, **25**, 25.

Iodides, metallic, compounds of aniline and toluidine with, **25**, 249.

Iodides, secondary, formation of, from olefines, **25**, 433.

Iodides and bromides, action of boracic acid on, **12**, 165.

Iodine, action of, on aniline, **1**, 271.

— — — action of, on barium dioxide, **4**, 211.

— — — action of, on conine, **1**, 355.

— — — action of, on insoluble sulphides, **24**, 884.

— — — action of, on mclaniline, **1**, 303.

— — — action of, on the oils of anise and fennel, **1**, 404.

— — — action of, on papaverine, **8**, 285.

— — — action of, on phosphorus, **5**, 289.

— — — atomic volume and specific gravity of, **11**, 92.

— — — behaviour of, with acids, **25**, 1073.

- Iodine, contamination of, with iodine cyanide, **24**, 763.
 — detection of, in the form of metallic iodides, **24**, 1084.
 — detection of, in organic bodies, **25**, 1039.
 — detection of, in the state of potassium iodide in urine, **25**, 1124.
 — diffusion of, in alcohol, **15**, 228.
 — estimation of, by Carius's method, **25**, 1039.
 — estimation of, in kelp-liquors, **25**, 1116.
 — general distribution of, **6**, 166.
 — heat produced by the combination of metals with, **6**, 247.
 — polarising crystals produced by the action of, on sulphate of quinine, **5**, 177.
 — primary spectrum of, **25**, 873.
 — reaction of, with guaiacum resin, **25**, 1115.
 — reactions of, with starch and dextrin, **25**, 72.
 — reaction of, with tannic acid, **25**, 73.
 — separation of, from bromine and chlorine, **10**, 234.
 — supply of, from the kelp of Guernsey, **11**, 252.
 — symbol of, in Brodie's chemical calculus, **21**, 417.
 — testing of commercial, **25**, 1115.
 — volumetric estimation of, **8**, 222 ; **24**, 436.
 Iodine and Chile saltpetre industry in Tarapaca, **25**, 1131.
 Iodine and chlorine together, volumetric estimation of, **8**, 224.
 Iodine bisulphide, **14**, 57.
 Iodine bromide, absorption-spectrum of the vapours of, **25**, 665.
 Iodine chloride, **24**, 197.
 — — absorption-spectrum of, **25**, 462.
 — — action of, on aniline, **17**, 328.
 — — action of, on benzoic acid, **17**, 332.
 — — action of, on carbazotic acid, **17**, 332.
 — — action of, upon opianyl, **9**, 276.
 — — action of, on orcin, **17**, 327.
 — — action of, on phloridizin and salicin, **17**, 331.
 — — compound obtained from benzene by the action of, **7**, 244.
 Iodine compounds, specific heat of, **19**, 197, 225.
 Iodine fluoride, preparation of, **11**, 164.
 Iodine green, dyeing of alpaca with, **24**, 1098 ; **25**, 188.
 Iodine vapour, dichroism of, **24**, 993.
 Iodine vapour, luminosity of, **25**, 596.
 Iodised cotton, **24**, 967.
 Iodoanistic acid, **18**, 314.
 Iodobenzoic acid, **18**, 305.
 Iodobenzoic acids, isomeric, **24**, 702.
 Iodochromate of potassium, **24**, 801.
 Iodocinchonidine sulphate, **11**, 143.
 Iodocinchonine sulphate, **11**, 151.
 Iododichloride of caesium, **19**, 147.
 Iododichloride of tetraethylammonium, **19**, 147.
 Iodoform, action of bromine on, **24**, 778.
 Iodopianyl, **9**, 276.
 β -Iodopropionic acid, **24**, 235.
 β -Iodopropionic acid, action of ammonia on, **24**, 127.
 Iodopropylene, **8**, 145.
 Iodoquinidine sulphate, preparation of, **11**, 139.
 Iodoquinine sulphate, optical properties of, **5**, 178—182.
 Iodoquinine sulphate, quantitative analysis of, **5**, 182—187.
 Iodostrychnine, periodide of, **18**, 105.
 Iodo-substitution compounds, action of hydriodic acid upon, **17**, 205.
 Iodosulphate of quinine, **11**, 133.
 Iodosulphates of the cinchona alkaloids, general characters of, **11**, 130.
 Iodosulphates, luteo- and roseo-cobaltic, derivatives of, **24**, 1169.
 Iodosulphuric acid and iodosulphates, **24**, 1164.
 Iodoxybenzoic acid, **18**, 308.
 Iridescent laminae in hypersthene, **24**, 1174.
 Iridium, atomic volume and specific gravities of, **11**, 63.
 — separation of, from platinum, **25**, 49.
 Iridium-compounds analogous to the combinations of ethylene with platinumous chloride, **25**, 48.
 Iridoline, **16**, 377.
 Irish sea, water of, **24**, 506.
 Iron, absorption of carbonic oxide by, **20**, 287.
 — absorption of hydrogen by, **20**, 284.
 — action of ammonium sulphhydrate on, **25**, 982.
 — action of, on mercuric ethide, **17**, 36.
 — action of water on, **24**, 103.
 — alleged action of cold in rendering, brittle, **24**, 444.
 — amount of copper in, **24**, 312.
 — analysis of some specimens of hot and cold blast, **1**, 330.

- Iron, bar-, silicium and manganese in, **25**, 1136.
- Iron in blast-furnace slags, estimation of, **25**, 1117.
- in the blood and in food, **25**, 832.
- in the blood of an invertebrate animal, **25**, 899.
- burnt, **24**, 790; **25**, 466, 561.
- cast, heat developed by friction of, **3**, 320.
- cast, determination of the "total carbon" in, **22**, 182.
- cold-short, **25**, 560.
- combustion of, in compressed oxygen, **17**, 52.
- composition of some varieties of foreign, **9**, 202.
- condition of carbon and silicon in, **24**, 106.
- corrosive action of sugar on, **7**, 105.
- crystalline or burnt, **25**, 466.
- decomposition of water by platinum and magnetic oxide of, at a white heat, **III**, 332.
- dialysis of sucrate of peroxide of, **15**, 253.
- dry process for the estimation of silicon in, **24**, 1212.
- effects of cold upon the strength of, **24**, 167.
- effects of phosphorus on the malleable qualities of, **22**, 81.
- estimation of manganese in, **25**, 925.
- estimation of, by standard solution of bichromate of potash, **15**, 329.
- direct estimation of, in iron ores, **15**, 336.
- estimation of phosphorus in, **24**, 159.
- estimation of sulphur in cast, **24**, 159.
- estimation of sulphur in crude, **9**, 20.
- estimation of sulphur and phosphorus in, **25**, 89.
- examination of some masses of native, discovered by Nordenskiöld, in Greenland, **25**, 882.
- galvanised, estimation of zinc in, **24**, 161.
- grey cast, composition of a carbonaceous substance existing in, **14**, 199.
- meteoric, from Augusta, Co. Virginia, gases occluded in, **25**, 797.
- — from the desert of Atacama, **24**, 1180.
- — determination of combined carbon in, **25**, 604.
- Iron, meteoric, from Greenland, **25**, 602, 796.
- — — three masses of, **24**, 1020.
- — — from Wisconsin, **24**, 329.
- — — from Zacatecas in Mexico, **11**, 236.
- Iron, modifications of the reaction of, by citric acid, **10**, 113.
- oxidation of, **24**, 198.
- passive state of, **22**, 141, 148.
- pig. analyses of, **16**, 392, 394.
- — occurrence of titanium in, and remarks on the use of titaniferous minerals in the manufacture of iron and steel, **16**, 387.
- Iron plates, Russian, manufacture of, **25**, 1136.
- Iron, puddling of, **25**, 555.
- quick approximative method of estimating minute quantities of, by means of a calorimeter, **5**, 27.
- reaction of meconic acid with the per-salts of, **II**, 114.
- red-short, **25**, 561.
- reduced by hydrogen, **25**, 676.
- refined, **25**, 554.
- report on patents connected with the reduction of, and the manufacture of steel, **10**, 125.
- Iron smelting, the chemical phenomena of, **24**, 446.
- Iron, specific gravity and atomic volume of, **III**, 59, 72.
- testing of bones for, **25**, 257.
- volumetric estimation of, by potassium iodide, **24**, 594.
- volumetric estimation of, in waters, **15**, 474.
- white cast, composition of, **25**, 677.
- Iron acetate (ferrie), **6**, 228.
- — as a mordant, **16**, 7.
- Iron amalgam, **16**, 378.
- Iron ammonio-azophosphate, **3**, 361.
- Iron azophosphate, **3**, 142.
- Iron, basic persulphate of, from Chile, **14**, 156.
- Iron carbonate, spathic, **II**, 105.
- Iron ferricyanide, dialysis of, **15**, 253.
- Iron, artificial magnetic oxide of, **I**, 14 (p).
- Iron, magnetic oxide of, specific gravity and atomic volume of, **III**, 81.
- Iron meta-peroxide, soluble, **15**, 250.
- Iron metaphosphate, **III**, 277.
- Iron minium, **25**, 270.
- Iron ore, brown, **II**, 321.
- Iron ore from Scend (Wiltshire), analysis of, **17**, 28.
- Iron ore, oolitic, of Wiltshire, occurrence of vanadium in pig-iron smelted from, **17**, 21.

- Iron ores, analysis of, **16**, 389, 393.
 — — — analysis of, and of siliceous minerals containing iron; the separation of oxide of iron from titanio acid, and the methods of estimating iron, **15**, 311.
 — — — separation and utilisation of the phosphoric acid in, **24**, 1219; **25**, 931.
 — — — titanium in, **15**, 339.
 — — — of Pennsylvania, **25**, 59.
 — — — oolitic, analysis of, **15**, 335.
 — — — pisolitic, from North Wales, **25**, 105 f.
 Iron oxide, absorption of ammonium salts by, **21**, 11, 14.
 — — — absorption of potassium salts by, **21**, 6, 13.
 — — — action of hydrogen on, **24**, 703.
 — — — behaviour of dialysed, **25**, 270.
 — — — composition of an acid, **1**, 240.
 — — — contained in the Bonnington water, **11**, 218.
 — — — for purification of coal-gas, **25**, 188.
 — — — method of separating, from raw sugar, **25**, 530.
 — — — separation of, from uranium oxide, **25**, 178.
 Iron oxides, reduction of, by carbonic oxide, **22**, 211.
 Iron oxychloride as a mordant, **16**, 413.
 Iron peroxide. See Iron Sesquioxide.
 Iron persalts. See Ferric Salts.
 Iron phosphide, crystalline, **25**, 677.
 Iron phosphides, **25**, 881.
 Iron phosphite, **20**, 373.
 Iron, platino-tersulphocyanide of, **7**, 27.
 Iron protochloride, diffusion of, **3**, 94.
 Iron protochloride, osmose of, **8**, 88.
 Iron protoxide, anhydrous, new method of producing, **25**, 285.
 Iron protosalts. See Ferrous Salts.
 Iron-pyrites from Chichiliane, **25**, 29 f.
 — — — preparation of thallium from, **17**, 116.
 — — — utilisation of the residue obtained from roasting, **24**, 449.
 Iron pyromecconate, **11**, 4.
 Iron pyrophosphotriamete, **19**, 9.
 Iron salt from ethereal solution of meconic acid, **11**, 116.
 Iron salts, the cause of sterility in peaty soils, **24**, 249.
 Iron selenites, **2**, 63.
 Iron selenocyanate, **4**, 19.
 Iron sesquichloride, action of hydrochloric acid on sulphide of mercury, in presence of, **12**, 159.
 Iron sesquichloride, compound of, with chloride of diplatotammonium, **5**, 216.
 — — — diffusion of, **4**, 94.
 Iron sesquioxide, estimation of, when mixed with alumina and titanio acid, **15**, 331.
 — — — reduction of the salts of, by means of vegetable substances, **11**, 120.
 — — — in vegetable ash, **11**, 187.
 — — — soluble, preparation of, by dialysis, **15**, 259.
 Iron sesquioxide and alumina, separation of, by potash, **15**, 331.
 Iron sesquioxide and titanio acid, separation of, **15**, 326, 332.
 Iron sesquioxide, alumina, and titanio acid, separation of, **15**, 333.
 Iron stone, bastard, technically known as "Jack," analysis of, **15**, 323.
 Iron stones, clay, analysis of, **25**, 53 f.
 Iron sulphides, specific gravities and atomic volumes of, **11**, 88.
 Iron and cyanogen, blue compounds of, **11**, 125.
 Iron and copper, double sulphides of, **15**, 125.
 Iron, copper, and potassium, complex cyanide of, **15**, 357.
 Iron and ferrocyanogen, estimation of, **25**, 90.
 Iron and lead, voltaic action between, in lead-coated cast-iron projectiles, **16**, 235.
 Iron and manganese, alloys of, their production and application to the manufacture of steel, **24**, 169.
 Iron and its oxides, decomposition of carbonic oxide by the joint action of, **24**, 798.
 Iron and steel, estimation of phosphorus in, **19**, 148.
 Iron and steel, manufacture of, **25**, 533.
 Iron and sulphur, relative proportion of, in the pyrites of certain specimens of Iowa coal, **25**, 228.
 Irrigation by sewage water, **10**, 287.
 Irrigation-canals, nitrous acid in the water and mud of, **24**, 950.
 Irritation, cutaneous, influence of, on tissue-change, **25**, 312.
 Isatin, **13**, 73.
 — — — action of melting potassium hydrate on, **11**, 271.
 Isatinic acid, formation of, from isatin, **11**, 212.
 Isobutret, **24**, 396.
 Isobromopropionic acid, **25**, 687.
 Isobutyl alcohol, conversion of normal butyl alcohol into, **25**, 47 f.
 — — — conversion of, into trimethyl carbinol, **25**, 475.

Isobutyl alcohol, derivatives of, **24**, 121.
 ——— inverse formation of, from trimethyl carbinol, **25**, 478.
 ——— physical properties of, **25**, 230.
 ——— reduction of isobutyric acid to, **25**, 475.
 Isobutyl aldehyde, **25**, 1001.
 Isobutyl-anisole, **24**, 221.
 Isobutyl-benzene, **24**, 220.
 Isobutyl-formic acid, **25**, 242.
 Isobutyl iodide, boiling point and specific gravity of, **25**, 231.
 Isobutyric acid from citradibromopyrotartaric acid, **25**, 814.
 ——— oxidation of, **24**, 126.
 ——— reduction of, to isobutyl alcohol, **25**, 475.
 Isocajputene, **14**, 64.
 Isocyanate, benzylic, **25**, 447.
 Isocyanate of potassium, **24**, 391.
 Isocyanurate, benzylic, **25**, 449.
 Isocyanuric acid, **25**, 625.
 Isodicyanic ethers, **24**, 392.
 Isodimaphthyl, **24**, 1184.
 Isohydrobenzoin, **24**, 384.
 Isohydriopiperoin, **24**, 935.
 Isolation of organic radicals, **2**, 263.
 Isomeric acids, $C_7H_6O_3$, iodised products of, **25**, 622.
 Isomeric compounds, theory of, **18**, 230.
 Isomeric ethers of the formula, $C_nH_{2n}O_2$, boiling points of, **18**, 30.
 Isomeric substances, examination of, by circular polarisation, **13**, 269.
 Isomeric transformation of fats, **5**, 197.
 Isomerism, contribution to the theory of, **25**, 288.
 Isomerism, remarks on, **18**, 329.
 Isomerism in the benzene series, **24**, 680; **25**, 708.
 Isomerism in the lactic series, **22**, 67.
 Isomerism among sulphates of alcohol-radicals, **23**, 418.
 Isomorphism, &c., and a simple law governing all crystalline forms, **2**, 148.
 Isomorphism of sodium nitrate and calespar, **24**, 197.
 Isonitriles, formation of, **24**, 137.
 Isophthalic acid, **24**, 826.
 ——— transformation of bromobenzoic acid into, **24**, 367.
 Isoprene, action of atmospheric oxygen on, **15**, 115.
 ——— action of bromine on, **15**, 118.
 Isoprene and caoutchou, action of bromine on, **15**, 110.
 ——— polymeric relations of, **15**, 117.
 ——— table of their physical properties, **15**, 123.
 Isopropacetate, ethylic, **20**, 109.
 Isopropacetic acid, **20**, 108.

Isopropacetone, **20**, 107.
 Isopropacetone-carbonate, ethylic, **20**, 104.
 Isopropyl alcohol, conversion of normal propyl alcohol into, **25**, 236.
 ——— oxidation of, to acetone by the action of chromic anhydride, **25**, 143.
 Isopropyl benzoate, **25**, 237.
 Isopropyl carbinol, **22**, 164.
 Isopropyl chloride, action of chlorine on, **25**, 134, 290.
 Isopropyl iodide, oxidation of, **19**, 487.
 Isopropyl iodide and sodium, action of, upon ethylic acetate, **20**, 102.
 Isopropylsulphonic acid, **25**, 998.
 Isopyre, **25**, 1049.
 Isosulphocyanate of potassium, **24**, 392.
 Isotetrachloro - diacetone - cyanhydrin, **24**, 922.
 Isotoluylen alcohol, **25**, 138.
 Isoxylene, reduction of, **25**, 893.
 Isuretine, **25**, 500.
 Itaconic acid, electrolysis of, **25**, 144.

J.

Jar-diffusion, **15**, 221.
 Jaulingite, distinction of, from rosthornite, **24**, 1175.
 Jersey, presence of phosphoric acid in the felspar of, III, 256.
 Jet, compound testing, **4**, 39.
 Jew's tin, analysis of the incrustated surface of a block of, **25**, 678.
Juglans cinerea, bark of, **25**, 909.
 Juice, gastric, optical rotatory power of, **14**, 256.
 ——— researches on the constituents of, **14**, 296.
 Juice of the larvæ of *Cimbex* species, **25**, 157.
 Julin's carbon chloride, synthesis of, **25**, 996.

K.

Kamala, **25**, 1034.
 Kaolin, American, containing titanate acid, analysis of, **15**, 323.
 Kelloway rock, manganese in, **18**, 207.
 Kelp of Guernsey, supply of iodine from the, III, 252.
 Kelp-liquors, estimation of iodine in, **25**, 1116.
 Kelp mother-liquors, new process of manufacturing potassium iodide from, **25**, 1130.

Kent water, analysis of, **4**, 378.
 Kermes, **25**, 43.
 Ketone of propionic acid, **4**, 1.
 Ketones, **25**, 892.
 Ketones, compounds of, with alkaline bisulphites, **8**, 154.
 Ketones, the oxidation of, as a means of determining the constitution of acids and alcohols, **25**, 408.
 Ketones and ethereal salts derived from the duplication of the molecule of acetic ether, constitution and chemical relations of, **19**, 419.
 Kidney-bean, analysis of, **2**, 12.
 ——— influence of light on the germination of the, **25**, 168.
 Kidneys and bladder, physiology of, **25**, 633.
 Kinic or quinic acid, detection of, **11**, 226.
 Kino, pyrocatechin in, **25**, 296.
 Kish, **22**, 222.
 Komenic acid. See Comenic Acid.
 Kreatine and kreatinine. See Creatine and Creatinine.
 Kryptophanates, metallic, **23**, 122.
 Kryptophanic acid, absorption of oxygen by, in alkaline solution, **23**, 121.
 ——— the normal free acid of human urine, **23**, 116.
 ——— theoretical considerations on, **23**, 132.
 Kyanethine, **1**, 69.
 Kynurenic acid, **25**, 1028.
 Kynurenine, **25**, 1028.

L.

Labradorite rocks of Waterville, New Hampshire, **25**, 227.
 Lactate of barium, analysis of, by oxidation with bichromate of potassium and sulphuric acid, **20**, 174.
 Lactate of calcium, compound of, with glyoxylate of calcium, **18**, 195.
 Lactate, ethylic, action of phosphorus trichloride on, **18**, 144.
 Lactic acid, **24**, 127.
 ——— analysis of, by limited oxidation, **20**, 173.
 ——— constitution of, **12**, 15.
 ——— conversion of, into acetone, **24**, 919.
 ——— conversion of, into propionic acid, **12**, 23.
 ——— conversion of pyroracemic acid into, **16**, 260.
 ——— from flesh, **24**, 362.
 ——— formation of, from sugar without fermentation, **24**, 546.

Lactic acid, heat produced by the combination of, with bases, **24**, 980.
 ——— oxidation of, **20**, 297.
 ——— produced by the fermentation of sugar, and that contained in the juice of flesh, difference between, **1**, 400.
 Lactic acid and cupric lactate, distillation of, **2**, 36.
 Lactic ethers, table of specific gravities of, **22**, 49.
 Lactic ferments, origin of, **25**, 259.
 Lactic series of acids, classification of, **22**, 62.
 ——— isomerism in, **22**, 67.
 ——— proximate analysis of, **22**, 76.
 ——— relations of the acrylic acids to, **18**, 151.
 ——— synthesis of, **22**, 28.
 ——— transformation of the, into the acrylic series, **18**, 133.
 Lactonic acid, **24**, 547.
Laminaria saccharina and other seaweeds, occurrence of mannite in, **11**, 136, 138.
 Land, conditions of fertility of, **24**, 278.
 Landes of Brittany, chemical studies on the, **25**, 320.
 Langite, **18**, 87.
 Lantanuric acid, **24**, 1200.
 Lanthanum, determination of, in tantalites and columbites, **25**, 194.
 ——— separation of, from cerium, didymium and yttrium, **24**, 494, 495.
 Lanthanum and cerium, volumetric separation of, **8**, 232.
 Lanthanum, cerium, and didymium, separation of, **2**, 140, 144.
 Lanthopine, **25**, 722.
 Lanuginic acid, **24**, 381.
Lapis lazuli, description of, found in large quantities in the Cordilleras of the Andes, **4**, 331.
 Larch bark, examination of, **1**, 213.
 Larch tree, larixinic acid, a crystallisable principle found in the bark of the, **16**, 310.
 Larixinic acid, a crystallisable principle found in the bark of the larch-tree, **16**, 310.
 Larixin, syn. with Larixinic acid.
 Laudanine, **24**, 1064; **25**, 722.
 Laudanosine, **24**, 1065; **25**, 724.
 Laurel-water, estimation of hydro-cyanic acid in, **4**, 219.
 Laurylene from bay-oil, **25**, 3.
 Lava block thrown out by Vesuvius during the eruption of April, 1872, **25**, 1081.
 Lavender, oil of, **17**, 10.
 Lea water, average hardness of, **4**, 387.

- Lead, action of Dee water on, **4**, 129.
- action of dilute saline solutions upon, **25**, 679.
 - action of soft water on, **7**, 401.
 - action of sugar on, **7**, 199.
 - action of sulphuric acid on, **16**, 66.
 - action of sulphuric acid and peroxide of, upon opianyl, **9**, 276.
 - action of water on, **4**, 20.
 - addition of, in the refining of copper, **25**, 340.
 - alloys of, **24**, 1166.
 - amalgam of, **16**, 385.
 - burnished, its reflecting power for the chemical rays, **17**, 77.
 - estimation of, in commercial copper, **14**, 294.
 - estimation of, in waters, **18**, 129.
 - in fuel, **3**, 70.
 - melted, specific gravity and atomic volume of, **111**, 74.
 - modification of the reactions of, by citric acid, **10**, 114.
 - occurrence of nickel in, and its concentration by Pattinson's process, **17**, 377.
 - solubility of, **11**, 19.
 - specific gravity and atomic volume of, **111**, 62, 67.
- Lead acetate, diffusion of, **4**, 91.
- action of basic and neutral, on solutions of sugar, **14**, 29.
- Lead acetoxybenzamate, **13**, 241.
- amylophosphate, **9**, 135.
 - anechoate, **10**, 173.
 - antimonite and antimonate, crystalline compounds of, from Constantine, **24**, 1016.
 - arsenite, **15**, 291.
 - azophosphate, **3**, 149.
 - bassiate, **2**, 236.
 - benzoglycollates, **5**, 77.
 - bibromacetate, **11**, 28 ; **12**, 4.
 - biiodacetate, **13**, 3.
 - bisulphimethylate, **1**, 54.
 - bromacetate, **11**, 24.
 - bromocoumarilate, **24**, 49.
 - bromopyromecconate, **6**, 81.
 - carbonate, native, from Teesdale, county of Durham, analysis of, **4**, 175.
 - carbonates constituting the white lead of commerce, composition and properties of, **4**, 165.
 - chloride, compound of, with diplatosammonium chloride, **5**, 213.
 - compound of, with lead orthovanadate, **24**, 34.
 - solubility of, in water and in dilute hydrochloric acid of various strengths, **21**, 350.
 - chlorocarbonate, **23**, 38.
- Lead chloromaleate, **13**, 11.
- comenate, **11**, 118.
 - coumarilate, **24**, 48.
 - dioxide, influence of, in facilitating the decomposition of potassium chlorate, **24**, 1155.
 - specific gravity and atomic volume of, **111**, 84.
 - disulphethiolate, **9**, 252.
 - disulphometholate, **9**, 246.
 - ethonide, **1**, 151.
 - ethylcrotonate, **18**, 137.
 - hyposulphamylate, **1**, 378.
 - hyposulphethylate, **1**, 49.
 - hyposulphimethylate, **1**, 54.
 - hyposulphite, **23**, 428.
 - iodide, action of, on some metallic acetates, **25**, 242.
 - iodide, its solubility in aqueous hyposulphite of soda, **16**, 29.
 - leucate, **14**, 315.
 - meconate, **11**, 113.
 - molybdates and vanadates, **24**, 500.
 - monoxide, action of phosphorous chloride on, **25**, 223.
 - preparation of pure, from red lead, **19**, 501.
 - specific gravity and atomic volume of, **111**, 84.
- Lead, organo-compounds of: their formation, **13**, 187, 189.
- their properties, **13**, 205.
- Lead orthovanadate, **24**, 34.
- oxalate, calcination of, **24**, 1156.
 - oxide, combination of acids with, **6**, 247.
 - combination of, with ordinary phosphoric acid, **1**, 188.
 - solubility of, in pure water, **11**, 399.
- Lead palmate, **111**, 225.
- perchlorate, **16**, 88.
 - peroxide, volumetric estimation of, **8**, 230.
 - phosphite, **20**, 372.
 - platino-tersulphocyanide, **7**, 29.
 - pyrogallate, **1**, 130.
 - pyromecconate, **6**, 80.
 - pyrophosphotriamates, **19**, 501.
 - pyrovanadate, basic, **24**, 33.
 - racemate, **1**, 25.
- Lead, red, manufacture of, **25**, 182.
- Lead salt analogous to cobalt-yellow, **13**, 335.
- Lead salts, action of bleaching powder on, **11**, 387.
- osmose of, **8**, 90.
- Lead selenites, **2**, 66.
- selenocyanate, **4**, 16.
 - suboxide, specific gravity and atomic volume of, **111**, 83.

- Lead sulphanisate, **10**, 212.
 — sulphate, black, amorphous, from Chile, **14**, 156.
 — — solubility of, in hydrochloric and nitric acids, **15**, 59.
 — — solubility of, in aqueous hyposulphite of soda, **16**, 29.
 Lead sulphate and sulphide, effect of heating, in hydrogen and carbonic oxide, **16**, 42.
 Lead sulphide, action of light on, and its bearing on the preservation of paintings in picture-galleries, **18**, 245.
 — — decolorizing power of, **22**, 123.
 Lead sulphide and sesquisulphide, specific gravity and atomic volume of, **III**, 89.
 Lead tartrate and racemate, **1**, 25.
 — thiophosphamate, **18**, 7.
 — tricarallyate, **18**, 338.
 Lead tubes with a lining of tin, **25**, 910.
 Lead, white, red coloration of, **25**, 881.
 Lead vanadates, **24**, 33.
 Lead and ammonium glyoxylate, **18**, 198.
 Lead and cadmium, reciprocal precipitation of, **9**, 293.
 Lead and copper in the ashes of coal, **2**, 1.
 — — reciprocal precipitation of, **9**, 292.
 — — double sulphide of, from Chile, **14**, 160.
 Lead, manganese, nickel and cobalt, volumetric estimation of the peroxides of, **8**, 230.
 Lead and its oxides, atomic weights of, **1**, 14.
 Lead and platinum, alloy of, **24**, 202.
 Lead and thallium, alloy of, **17**, 145.
 Lead and tin, physical properties of the alloys of, remarks on, **15**, 106.
 — — reciprocal precipitation of, **9**, 292.
 Lead, tin, antimony and copper, analysis of alloys containing, **15**, 462.
 Lead-chamber crystals, formula of, **25**, 627.
 — — reaction of, with water, **25**, 595.
 Lead-coated cast-iron projectiles, voltaic action in, **16**, 235.
 Lead bullets, melting of, by impact on iron plates, **24**, 798.
 Leadbills, new mineral from, **24**, 500.
 Lead-process, Brücke's, detection of sugar in healthy urine by, **14**, 37.
 Leads of the Upper Hartz, composition of, **24**, 601.
 Leather, dyeing of, with coal-tar colours, **25**, 1046.
 Leaves, absorption-spectrum of, **25**, 761.
 — decoloration of, by electric discharges, **24**, 883.
 — green colour of, **24**, 654.
 — transpiration of watery fluid by, **24**, 850.
 Lecanorin, **1**, 73.
 Lecture experiments, **18**, 156; **24**, 186, 187, 304, and illustrations.
 Lecch, hæmoglobin in the, **25**, 256.
 Legumin from pulse of South Russia, composition of, **25**, 915.
 Leguminous plants, experiments on the assimilation of free nitrogen by, **16**, 175, 183.
 Leidenfrost's phenomenon, **24**, 974.
Lemna trisulca, ash of, **14**, 219.
 Lemon juice, analysis of the ash of, **7**, 44.
 Lemon oil, **4**, 158; **17**, 10.
 Lemon oil, cymene from, **25**, 1009.
 Lemon-grass, oil of, **17**, 10.
 Lepamine, **16**, 376.
 Lepidine, derivatives of, **25**, 295.
 Lepidine, action of amyl iodide on, **16**, 375.
 Lepidolite, preparation of cesium and rubidium salts from, **25**, 880.
 Lerp amylin and lerp-manna, **24**, 543.
 "Le Salant," note on, **25**, 86.
 Leucate of ammonia, **14**, 310.
 — of barium, **14**, 310.
 — of calcium, **14**, 310.
 — of cobalt, **14**, 310.
 — of ethyl, action of phosphorus trichloride on, **18**, 133.
 — of lead, **14**, 315.
 — of magnesium, **14**, 310.
 — of silver, **14**, 314.
 — of sodium, **14**, 310.
 — of zinc, **14**, 311.
 Leucates of mercury, **14**, 313.
 Leucic acid, and some of its salts, **14**, 307.
 Leucinide, **23**, 409.
 Leucine, alleged formation of, from thialdine, **10**, 199—202.
 — behaviour of, with the nitrates of mercury, **24**, 720.
 — compound of, with cupric oxide, **24**, 720.
 — formation of, in alcoholic fermentation, **25**, 260.
 — obtained by heating serum albumin with water, **24**, 733.
 — preparation of, from the aldehyde of valerianic acid, **8**, 157.
 — valerianic acid from, **25**, 243.
 — from vegetable proteids, **24**, 719.
 Leucocorallin, **25**, 705.

- Lencol and chinoline, identity of, **11**, 384.
 Leucoline, **25**, 657.
 Leucoline oil, **25**, 306.
 Leucoline and chinoline series, **16**, 375.
 Leukhæmia, blood and urine in, **24**, 421.
 — reaction of the blood in, **25**, 833.
 Levoracemic acid, **3**, 81.
 Lias and oolite, presence of manganese in, **18**, 206.
 Liebens, modes of estimating the amount of colour-yielding matter in, **20**, 226.
 — physiological chemistry of, **25**, 639.
 — substances contained in the, employed for preparation of archil and cudbear, **1**, 71.
 Liebethenite from Congo in Portuguese Africa, **11**, 242.
 Life, influence of changes in barometric pressure on the phenomena of, **25**, 831, 1029.
 Light absorption, connection of optical and chemical, **24**, 302.
 Light, action of, on chloride of silver, **10**, 74.
 — action of, on chlorine and bromine, **25**, 28.
 — action of, on chlorophyll, **25**, 160.
 — action of, upon gun-cotton, **20**, 511, 575.
 — action of, on mixtures of alkaline dichromate and gelatin, **24**, 304.
 — action of, on red prussiate of potash, **24**, 303.
 — action of, on sulphide of lead, **18**, 245.
 — effect of artificial, on coal-tar colours, **14**, 254.
 — chemical and mechanical alterations of haloïd silver salts by, **25**, 29.
 — circular polarisation of, by transmission through fluids, **11**, 26.
 — from clouds, constant colour and intensity of, **24**, 183.
 — of combustion, influence of compression of the air on the, **15**, 187.
 — — influence of rarefaction, **15**, 177.
 — effect of, on haloïd salts of silver, **24**, 481.
 — flashes of, observed during the crystallisation of strontium nitrate, **1**, 5 (p).
 — influence of, on the evolution of oxygen by water-plants, **24**, 1080.
 — influence of, on the germination of the kidney-bean, **25**, 168.
 — refraction and dispersion of, in silver iodide, bromide, and chloride, **24**, 653.
 Light, sensitiveness of haloïd silver-salts to, **24**, 302.
 Light, solar, action of, on ethyl iodide, **3**, 322.
 Light carburetted hydrogen, diffusion velocity of, **16**, 400.
 Light carburetted hydrogen, igniting point of, **16**, 399.
 Lightning, spectrum of, **25**, 118.
 Light-printing, improvements in, **24**, 1100.
 Lign aloe, essential oil of, **25**, 2, 12.
 Lignin, function of, in the structure and development of plants, **24**, 575.
 Lignin and cellulose, comparative nutritive value of, **24**, 575.
 Lignite, action of alkalis on, **25**, 511.
 — illuminating gas from Bohemian, **25**, 1138.
 Lignites, composition and heat of combustion of, **25**, 183.
Limax flava, iron in the blood of, **25**, 879.
 Lime, action of, in the blast-furnace, **22**, 222.
 — combination of acids with, **6**, 246.
 — compounds of sugar with, **25**, 810.
 — effect of, in diminishing the amount of sulphur evolved in the distillation of coal, **11**, 234.
 — estimation of, **25**, 263.
 — composition of gas-, **11**, 359.
 — mixing of hydraulic, **25**, 528.
 — prevention of injury from the presence of, in brick clay, **24**, 765.
 — prevention of the precipitation of, by citric acid, **10**, 112.
 — softening of water with, **25**, 272.
 — specific gravity and atomic volume of, **11**, 86.
 — use of, as manure, **24**, 278.
 — use of, in sugar-refining, **22**, 123.
 — volumetric estimation of, in water, **15**, 472.
 Lime amidobenzoate, **9**, 270.
 — benzoglycollates, **5**, 77.
 — biconenate, **4**, 365.
 Lime-boric methide, **15**, 380.
 Lime, chloride of, spontaneous decomposition of, **13**, 84.
 — comenate, neutral, **4**, 366.
 — dinitroethylate, **11**, 87.
 — glyoxylate with bisulphite of lime, **18**, 194.
 — glyoxylate with lactate of lime, **18**, 195.
 — hydrate, action of bromine on, **15**, 478.
 — leucate, **14**, 310.
 — methylodithionate, **10**, 248.
 — nitrate, diffusion of, **4**, 91.

- Lime phosphate, occurrence of considerable deposits of crystallised, in teak-wood, **15**, 91.
 — phosphate, occurrence of deposits of crystallised, in human urine, **15**, 8.
 — phosphates, native, **25**, 795.
 — pyromecconate, **6**, 79.
 Lime salts. See also Calcium Salts.
 — succate, dialysis of, **15**, 254.
 — sulphate; its solubility in aqueous hyposulphite of soda, **16**, 29.
 Lime and ammonia arsenate, **11**, 10.
 Lime and ammonia glyoxalate, **18**, 196.
 Lime and baryta, action of anhydrous, on chloraniline, **11**, 284.
 Lime and potash, sulphate of (potassogypsite), **3**, 348.
 Lime-plants, **24**, 1209.
 Lime-refuse of gasworks, useful application of, **11**, 358.
 Limestone, oil-bearing, of Chicago, **24**, 674.
 Lim-tree, saccharine matter found on the leaves of a, **25**, 316.
 Liming, improvement of London water by, **4**, 393.
 Limited oxidation with alkaline permanganate, **20**, 301.
 — — — quantitative analysis by, **20**, 173.
Limnaeus, hæmoglobin in the pharynx of, **25**, 255.
 Linen, waterproofing of, **24**, 767.
 Lines of the spectrum, influence of pressure on, **25**, 664.
 Liquid conductors, electromotive force of induction in, **24**, 651.
 Liquid diffusion, application of, to produce decomposition, **3**, 60.
 Liquid diffusion applied to analysis, **15**, 216.
 Liquid, Dutch, new member of the series, resulting from the action of chlorine on, **1**, 79.
 Liquid and gaseous states of matter, continuity of, **23**, 74.
 Liquids, compressibility of, under high pressure, **25**, 974.
 — — — conduction of electricity through, **25**, 207.
 — — — constitution of, **25**, 1071.
 — — — diastinct power of, **17**, 71.
 — — — diffusion of, **3**, 207, 601; **4**, 83 — 104; **15**, 216.
 — — — electric conduction by, without electrolysis, **25**, 209.
 — — — heterogeneous, determination of the weight of, **19**, 455.
 — — — influence of certain, in retarding the action of acids upon metals, **25**, 116.
 Liquids of low boiling point, condensation of, **24**, 141.
 — — — phenomena observed in the distillation of certain mixtures of, insoluble the one in the other, **24**, 975.
 — — — possessing optical rotatory power, table of some, **11**, 44.
 — — — specific heat, densities and expansions of, **24**, 94.
 — — — thermo-electric action of, **24**, 476.
 — — — transpiration of, **26**, 219.
Liquor Opii sedativus, microscopical characters of, **18**, 39.
 Lithiophorite, **24**, 205.
 Lithia-mica, occurrence of, in the Fichtelgebirge, **24**, 1180.
 Lithium, injurious action of, in vegetation, **25**, 165.
 — — — preparation of, **8**, 143.
 — — — solubility of, in liquid ammonia, **24**, 310.
 — — — spectrum produced by, **13**, 276.
 Lithium carbonate, action of boracic acid on, **12**, 181, 187.
 Lithium hydrate, **25**, 1074.
 Lithium minerals, behaviour of, before the spectroscope, **24**, 312.
 Lithium selenite, **2**, 68.
 Lithium sulphite, **2**, 207.
 Lithium and sodium, separation of, **25**, 468.
 Litmus, chromatic phenomena of, **10**, 88.
 Litmus paper as a reagent, **25**, 321.
 Liver, glycogenic function of, and its relation to diabetes, **25**, 901.
 Liver, preparation of glycogen from, **25**, 83.
 Lizaric acid, **12**, 208.
 Lobaric acid, **25**, 640.
 Log ($1 + 003665 t$) 760, table of, for each $\frac{1}{10}$ of a degree from 0° to 30° C., **21**, 120.
 Logwood test for alum in bread, **25**, 923.
 Lokao, &c., uses of, in dyeing, **25**, 707.
 London basin, existence of phosphoric acid in the deep well-water of the, **11**, 392.
 Lophine, **9**, 220.
 Lophine, compound of, with nitrate of silver, **9**, 225.
 Lophine, formation of, **8**, 161.
 Löneburgite, **24**, 326.
 Luminous tubes with exterior electrodes, **24**, 1141.
 Lung, enormous proportion of earthy matter in a human, **24**, 424.
 Lupines, analysis of the ash of, **9**, 46.
 Lupine-seed as fodder, **25**, 612.
 Lupine-seed, yellow, constituents of, **25**, 519.

Lute, simple quicksilver, **25**, 528.
 Luteo-cobaltic iodosulphate, derivatives of, **24**, 1169.
 Lutidine, **5**, 53; **7**, 101.
 Lutidine in tobacco-smoke, **24**, 1077.
 Lycopetone, **25**, 305.
Lycopodiaceæ, alumina in, **14**, 222.
 Lycopodium, alkaloids obtained from, **3**, 315.
 Lyellite, **18**, 83.

M.

Machine-puddling, **25**, 557.
 Madder, chemical examination of, **1**, 403.
 — colouring matters of, **12**, 198.
 — red colouring matters of, **3**, 243.
 Madder-purple, **5**, 62.
 Madder-red, madder-purple, and madder-orange, **12**, 201.
 Madder-root, alteration of, by keeping, **5**, 56.
 Magdala-red, **25**, 695.
 — — — — — dyeing of silk with, **24**, 1223.
 Magenta, or fuchsine, **14**, 237.
 Magnesia, estimation of phosphoric acid by, **1**, 186.
 — estimation of, by sodium phosphate, **1**, 186.
 — modification of the reactions of, by citric acid, **10**, 111.
 — quantitative determination of phosphoric acid by salts of, **16**, 304.
 — separation of, from alkalis, **1**, 185; **2**, 99; **21**, 519.
 — separation of the alkalis from, by means of silver carbonate, **1**, 387.
 — separation of calcium phosphate from, **11**, 142.
 — separation of, from potash and soda, **2**, 99; **24**, 955.
 — solubility of, in alkaline salts, **18**, 27.
 — specific gravity and atomic volume of, **11**, 86.
 — volumetric estimation of, in waters, **15**, 172.
 Magnesia salts. See Magnesium Salts.
 Magnesian limestone, hydraulic, hardening of, **25**, 340.
 Magnesium, **19**, 141.
 — alloys of, **20**, 119.
 — behaviour of, with arsenic, **20**, 127.
 — behaviour of, with carbides of hydrogen, **20**, 130.
 — behaviour of, with oxides of carbon, **20**, 129.
 Magnesium, behaviour of, with oxides and carbonates, **20**, 128.
 — behaviour of, with phosphorus, **20**, 126.
 — behaviour of, with sulphur, **20**, 127.
 — burning of, in carbon dioxide, **24**, 188.
 — electric spectrum of, **17**, 81.
 — experiments on acid sulphite of, **25**, 673.
 — heat of combustion of, **24**, 643, 793.
 — preparation of, **8**, 107.
 — specific gravity of, **11**, 73.
 — use of, in Marsh's test for arsenic, **25**, 1042.
 Magnesium, amidobenzoate, **9**, 270.
 — arsenite, **15**, 294.
 — benzoglycollate, **5**, 77.
 — chloride, osmose of, **8**, 85.
 — chrysammate, **19**, 323.
 — diazo-amidominate, **18**, 314.
 — diazo-amidobenzoate, **18**, 301.
 — dinitroethylate, **11**, 87.
 — hyposulphite, **23**, 429.
 — leucate, **14**, 310.
 — malates, analyses of, **1**, 31.
 — metaphosphate, **11**, 279.
 — methylodithionate, **10**, 247.
 — nitrate, diffusion of, **4**, 93.
 — nitrate, osmose of, **8**, 85.
 — oxycellulose, hydrate of, **24**, 1168.
 — phosphate, **11**, 310.
 — phosphide, **18**, 106; **20**, 309.
 — phosphite, **20**, 362.
 — pyromecconate, **6**, 79.
 — pyrophosphotriamete, **19**, 10.
 — salts, influence of ammonium carbonate on, **15**, 196.
 — selenites, **2**, 61.
 — selenocyanate, **4**, 19.
 — sulphate, diffusion of, **4**, 94.
 — — — — — osmose of, **8**, 67.
 — — — — — specific gravity and volume of, in aqueous solution, **11**, 197.
 Magnesium sulphate springs of Hunjadi Janos, near Ofen, **24**, 1021.
 Magnesium sulphates, heat evolved in the hydration of, **1**, 111.
 Magnesium and ammonium arsenate, **11**, 80.
 Magnesium and ammonium carbonate, **15**, 199.
 Magnesium and ammonium chloride, composition of the crystalline deposit from a solution of, **25**, 674.
 Magnesium and sodium sulphate, measurement of the crystals of, **11**, 391.
 Magnesium-ethyl, formation of, by the action of mercury and magnesium on sodium-ethyl, **19**, 129.

- Magnesium-ethyl and magnesium-methyl, **13**, 180, 193.
 Magnetic iron-ore, crystals of, from Traversalla, **25**, 56.
 Magnetic oxide of iron, decomposition of water by, at a white heat, **111**, 332.
 Magnetic pyrites, **24**, 326.
 Magnetism or electricity, influence of, on circular polarisation, **13**, 261.
 Magnets, permanent, experiments on the application of, to the explosion of charges, and to submarine operations, **14**, 180.
 Maize, analysis of the ash of, **9**, 46.
 — water-culture experiments with, **24**, 1081.
 Malate of barium, **1**, 34.
 — of calcium, **1**, 29.
 — of copp r, **1**, 33.
 — of magnesium, **1**, 31.
 — of silver, **1**, 24, 33.
 — of strontium, **1**, 34.
 — of thallium, **17**, 150.
 — of zinc, **1**, 32.
 Malates, conversion of, into fumarates at high temperatures, **1**, 35.
 Malden Island guano, **25**, 1112.
 Maleic acid, molecular weight of, **25**, 891.
 Maleic acid, **1**, 28.
 — — action of, on light, **5**, 65.
 — — active and passive, **5**, 63.
 — — conversion of, into succinic acid, **2**, 95.
 — — garden rhubarb as a source of, **1**, 193.
 — — rotatory power of, **25**, 814.
 — — transformation of ammonium fumarate into, **5**, 63.
 — — transformation of, into maleic and fumaric acid, **5**, 63.
 Malonic acid, formation of, **17**, 109.
 — — its relation to pyroracemic acid, **16**, 263.
 Malt, distribution of diastase in, **25**, 1110.
 Malt-extract, action of, on starch, **25**, 580.
 Malt and grape yeast-plants, comparative fermentative properties of, **23**, 393.
 Malting without germination, **24**, 458.
 Maltose, the end-product of the action of malt-extract on starch-paste, **25**, 588.
 Malt-wort, fermentation of, **25**, 574.
 Mammals, blood of, **24**, 736.
 Mammoth, proportion of ordinary to soluble ossein in the bone of a, **24**, 734.
 Man, blood of, **24**, 736.
 Mandelic acid, synthesis of, **25**, 708.
 Manganate of potassium, preparation and uses of, **24**, 868.
 Manganese, action of sunlight on, **20**, 10.
 — action of grape-sugar in preventing the precipitation of, as sulphide, **10**, 117.
 — amount of, in certain minerals, **24**, 1177.
 — analysis by the method of Fresenius and Will, **25**, 264.
 — in the blood, **24**, 1071.
 — contribution to the history of the oxides of, **17**, 294.
 — estimation of, **25**, 1044.
 — estimation of, in cast-iron, steel, and bar iron, **25**, 925.
 — estimation of, in Spiegeleisen and ferromanganese, **24**, 756.
 — metallic, **25**, 1077.
 — metallurgy of, **25**, 1076, 1143.
 — occurrence of thallium in minerals containing, **17**, 143.
 — in pig-iron, **25**, 551.
 — presence of, in oolite and lias, **18**, 206.
 — spectra of, in blowpipe beads, **25**, 524.
 — specific gravity and atomic volume, **111**, 59.
 — in steel, **21**, 282.
 — in steel and bar-iron, **25**, 1136.
 — testing for, with potassium ferricyanide, **24**, 757.
 Manganese chloride, diffusion of, **4**, 93.
 Manganese monoxide, combinations of ordinary phosphoric acid with, **1**, 388.
 — — and sesquioxide, specific gravities and atomic volumes of, **111**, 80.
 Manganese oxide, determination of, **111**, 300.
 — — effect of, in facilitating the decomposition of potassium chlorate by heat, **24**, 1155.
 Manganese peroxide, action of hydrochloric acid on sulphide of mercury, in presence of, **12**, 160.
 — — volumetric estimation of, **8**, 230.
 — — and sulphuric acid, volatile products of the decomposition of albumin, fibrin, casein, and gelatin, by means of, **1**, 82.
 Manganese phosphite, **20**, 368.
 Manganese protosalts of. See Manganous Salts.
 Manganese salts, growth of maize in solutions containing, **24**, 1082.
 — — osmose of, **8**, 88.

- Manganese selenites, **2**, 64.
Manganese sesquioxide and chromic acid, **4**, 300.
—— combinations of, **1**, 389.
Manganese sulphide, specific gravity and atomic volume of, **III**, 87.
Manganese, lead, nickel, and cobalt, volumetric estimation of the peroxides of, **8**, 230.
Manganic acid, volumetric estimation of, **8**, 232.
Manganous chloride, diffusion of, **4**, 493.
—— preparation of pure, **25**, 1078.
—— some reactions of, **25**, 1077.
Manganous chrysammate, **19**, 323.
Manganous metaphosphate, **III**, 277.
Manganous pyrophosphotriamate, **19**, 10.
Manganous sulphate, action of potassium chromate on, **1**, 30 (p).
—— use of, as a test for ozone, **20**, 1.
Manganous valerate, **24**, 1045.
Mangolds, assimilation of, by sheep, **24**, 1074.
—— nutritive value and composition of, **25**, 913.
Mangostin, **8**, 190.
Manna from Kurdistan, **25**, 813.
Mannite, existence of, in *Triticum repens*, or couch grass, **II**, 139.
—— hexane from, **25**, 1085.
—— and its isomerides, acetyl-derivatives of, **25**, 66.
—— occurrence of, in *Laminaria saccharina* and other sea-weeds, **II**, 136.
—— oxidation of, by caustic potash, **20**, 30.
—— oxidation of, by a mixture of potassic bichromate and sulphuric acid, **20**, 31.
—— oxidation of, by potassium permanganate, **20**, 32.
—— reaction of, with acetic anhydride, **25**, 70.
—— thermal effects of the combination of, with bases, **24**, 977.
Manometer for high pressure of gases, **24**, 482.
Manure, analysis of a so-called universal, **24**, 854.
Manure (earth-closet), composition and agricultural value of, **25**, 523.
Manure (farm-yard), composition of, **II**, 309; **25**, 522.
Manure, preparation of a fixed, from urine, **III**, 302.
Manure, seaweed as, **25**, 1111.
Manures, analysis of, prepared from sewage, **10**, 282.
Manures, modification of composition of, by soils, **24**, 293.
—— phosphatic, analysis of, **25**, 326.
—— proportion and composition of, required for a ton of fresh vegetable, **III**, 25.
Manures, saline, containing nitrogen, **1**, 152.
Manurial matters, dry system of collecting, **19**, 83.
Manurial value of town sewage, **10**, 277.
Manuring with powdered phosphorite, **25**, 839.
Manuring with straw, **25**, 1112.
Maple, spring period of, **25**, 170.
Marble, Blue Forest, colouring matter of, **17**, 379.
Marceline, **25**, 127.
Margoric acid, compounds of glycerin with, **6**, 284.
Margoric acid in human excrements, **10**, 166.
Margarin in human fat, **5**, 85.
Margarins, **6**, 284.
Maignac's oil, **17**, 156.
Marl, influence of, on the formation of carbonic acid and nitric acid in soils, **24**, 751.
Marl, use of, as manure, **24**, 278.
Marmatite, **19**, 135.
Marsh-gas, action of chromic acid on, **25**, 590.
—— conversion of, into ethylene, **17**, 43.
—— cyanogen-derivative of, **19**, 352.
—— electric spectra of metals taken in, **17**, 85.
—— formation of acetylene from, **17**, 43.
—— formation of naphthalene from, **17**, 44.
—— formation of, from sulphide of carbon and sulphuretted hydrogen, **17**, 40.
—— method of demonstrating the composition of, **18**, 171.
Marsh-gas and carbonic oxide, formation of propylene from, **17**, 45.
Matico, Peruvian, pharmaceutical and chemical characters of, **II**, 123.
Matter, colloidal condition of, **15**, 264.
—— continuity of the gaseous and liquid states of, **23**, 74.
—— speculative ideas respecting the constitution of, **17**, 368.
Mauve dye, **14**, 232.
Meadow-grass, influence of river and spring water on, **25**, 518.
—— nutritive value on, **25**, 914.
Meadow-hay, assimilation of, by sheep, **24**, 1071.

- Meadow-hay, composition and digestibility of, **25**, 1037.
 — composition and digestibility of the fat of, **25**, 1037.
 — percentage of fat and wax in, **24**, 1193.
 Meat, brine of salt, **17**, 405.
 Mat-extract, base from, **24**, 716.
 Meat-extracts considered from a physiological point of view, **25**, 158.
 Meconamidic acid, **6**, 75.
 Meconate of ammonia, action of chlorine on, **6**, 73.
 — — bibasic, **6**, 72.
 Meconate of lead, **11**, 113.
 — of morphine, microscopical appearance of, **18**, 36.
 Meconic acid, **11**, 1, 114; **15**, 450.
 — — action of bromine on, **6**, 73.
 — — coupled ether of, **6**, 76.
 — — derivatives of, **6**, 72.
 — — ethers of, **6**, 73.
 — — iron salt from ethereal solution of, **11**, 116.
 — — microscopic characters of, **18**, 37.
 — — products of the distillation of, **11**, 1, 6.
 — — reaction of, with ferric salts, **11**, 114.
 — — salts of, **11**, 113.
 Meconin, **15**, 454.
 — action of hydriodic and hydrochloric acids on, **16**, 350; **21**, 360.
 — analyses of, **16**, 349.
 — crystalline form of acid, $C_9H_8O_4$, derived from, **21**, 365.
 — formation of, from opianic acid, **16**, 350.
 — formation of, from opianic acid by the action of sodium amalgam, **21**, 359.
 — identity of, with opianyl, **9**, 274.
 — microscopical appearance of, **18**, 37.
 — normal, **16**, 361.
 — preparation of, **9**, 273.
 Mecono-ethylmeconic acid, **6**, 76.
 Melaconite, **19**, 135.
Melaleuca ericifolia, oil of, **17**, 10.
Melaleuca linarifolia, oil of, **17**, 10.
 Melampyrin, action of hydriodic acid on, **15**, 458.
 — constitution of, **15**, 456.
Melampyrum arvense, chromoglucoside from the seed of, **25**, 424.
 Melaniline, **1**, 285; **7**, 184.
 — action of bromine on, **1**, 299.
 — action of chlorine on, **1**, 298.
 — action of cyanogen on, **1**, 308.
 Melaniline, action of heat on, **2**, 320.
 — action of iodine on, **1**, 303.
 — action of nitric acid on, **1**, 304.
 — combinations of, **1**, 291.
 — composition of, **1**, 287.
 — compound of, with silver nitrate, **1**, 297.
 — metamorphoses of, **1**, 298.
 — preparation of, **1**, 287.
 — properties of, **1**, 290.
 Melaniline aurochloride, **1**, 296.
 — binoxalate, **1**, 292.
 — hydriodide, **1**, 294.
 — hydrobromide, **1**, 293.
 — hydrochloride, **1**, 293.
 — hydrofluoride, **1**, 294.
 — nitrate, **1**, 291.
 — phosphate, **1**, 293.
 — platinochloride, **1**, 294.
 — sulphate, **1**, 291.
 Melanoximide, action of heat on, **2**, 313.
 Melaphyres of the Lesser Carpathians, **24**, 321.
 Mellitic acid, **24**, 372.
 Mellitic acid and its products of decomposition, **1**, 382.
 Mellone, formation of, **1**, 5 (p).
 Mellonides, **8**, 259.
 Mellophanic acid, **24**, 372.
 Melolonthine, **24**, 1201.
 Melting point, influence of a change of specific gravity on the, **25**, 460.
 Melting point of selenium, **5**, 91.
 Melting point of stearin, **5**, 200, 205.
 Melting points of alloys of tin and lead, **15**, 32.
 Melting points of fats, table of, **5**, 210.
 Melting points of organic bodies, apparatus for estimating, **24**, 973.
 Melting and solidifying points of fats, **24**, 476.
 Menaphthalamine, combinations of, **9**, 10.
 — metamorphoses of, **9**, 12.
 — preparation of, **9**, 8.
 — properties of, **9**, 10.
 Menaphthoximide, action of heat on, **9**, 15.
 Meneghinite, new locality of, **24**, 671.
 Menthol or mentholic alcohol, **15**, 29; **25**, 10.
 Menthyl butyrate, **15**, 27.
 Menthyl chloride, **15**, 27.
 Mercaptan, allylic, **10**, 320.
 Mercaptan, butylic, **8**, 274.
 Mercaptan, ethylic, behaviour of triethylphosphine with, **13**, 302.
 Mercaptan, nitrobenzylic, **25**, 1027.
 Mercaptan, perchloromethylic, **24**, 344.
 Mercerized cotton, **16**, 406.
 Mercurial salts of sulphur-urea, **22**, 12.

- Mercurial vapours, diffusion of, **25**, 225.
 Mercuric amyliide, **16**, 420.
 ——— action of zinc upon, **17**, 32.
 Mercuric anchoate, **10**, 173.
 ——— azophosphate, **3**, 149.
 ——— bibromacetate, **12**, 4.
 ——— chloride, compound of, with chloroaniline, **11**, 281.
 Mercuric chloride and ammonium bichromate, double salt of, **1**, 21.
 Mercuric chloride and potassium bichromate, double salt of, **1**, 21.
 Mercuric chloride and neutral potassium chromate, double salt of, **1**, 22.
 Mercuric chloro-amyliide, **16**, 422.
 Mercuric cyanide, action of, on butyl iodide, **25**, 1092.
 ——— compound of silver chromate with, **1**, 24.
 ——— compound of, with strychnine, **2**, 260.
 ——— compound of, with hydrochloride of strychnine, **2**, 261.
 Mercuric ethide, **16**, 419; **19**, 150.
 ——— action of cadmium on, **16**, 21.
 ——— action of various metals upon, **17**, 35.
 ——— action of sodium on, **16**, 20.
 ——— action of zinc upon, **17**, 31.
 ——— formation of, by the reaction of mercury with copper, iron, or silver, and sodium-ethyl, **19**, 130.
 Mercuric fulminate, explosion of, **23**, 44.
 Mercuric iodide, change of colour in, **1**, 85.
 ——— compound of, with aniline, **25**, 249.
 ——— solubility of, in aqueous sodium hyposulphite, **16**, 29.
 Mercuric iodide and bromide, compounds of, with the alkaloids, **11**, 97.
 Mercuric methide, **16**, 417.
 ——— action of terchloride of antimony on, **86**, 22.
 ——— action of zinc upon, **17**, 30.
 Mercuric nitrate, compounds of urea with, **6**, 5—7.
 ——— preparation of, **6**, 8.
 Mercuric oxide, action of bromine-water on, **15**, 481.
 ——— action of, on iodide of potassium, **25**, 987.
 ——— compounds of, with urea, **6**, 2—4.
 ——— determination of, in a solution of the nitrate, **6**, 14.
 ——— action of dry bromine on, **15**, 483.
 ——— native combinations of, with oxide of antimony, **12**, 27.
 ——— quantitative determination of chlorine in neutral liquids by means of, **6**, 7.
 Mercuric oxide, specific gravity and atomic volume of, **111**, 84.
 Mercuric pyrophosphotriamate, **19**, 11.
 Mercuric selenocyanate, compound of, with mercuric chloride, **4**, 16.
 Mercuric sulphide, action of hydrochloric acid on, in presence of certain other substances, **12**, 158.
 Mercuric sulphide, amorphous, occurrence of, in the mineral kingdom, **24**, 671.
 Mercuric sulphocyanate, double salts of, **25**, 626.
 Mercurous anchoate, **10**, 173.
 Mercurous chloride, compound of, with diplatamonium chloride, **5**, 215.
 ——— compound of, with strychnine, **2**, 257.
 ——— compound of, with sulphate of strychnine, **2**, 258.
 ——— compounds of, with ammonium bichromate, **3**, 202.
 Mercurous chromate, neutral, **1**, 24.
 Mercurous coumarilate, **24**, 48.
 Mercurous nitrate, preparation of fuchsine by the action of, on aniline, **14**, 238.
 Mercurous oxide, specific gravity and atomic volume of, **111**, 84.
 Mercurous perchlorate, **16**, 88.
 Mercurous and mercuric nitrates, and mercurous nitrite, compounds of, with tyrosine, **22**, 283.
 Mercury, action of, upon iodide of methyl, **6**, 65.
 ——— action of sugar on, **7**, 199.
 ——— apparent expansion of, **24**, 483.
 ——— colloid bodies containing, **24**, 561.
 ——— electric spectrum of, **17**, 81.
 ——— estimation of, in its ores, **25**, 927.
 ——— heat developed by friction of, **3**, 320.
 ——— modification of the reactions of citric acid, **10**, 115.
 ——— organo-compounds of: their formation and properties, **13**, 183, 188, 207.
 ——— precautions against the injurious influence of, on workmen in the manufacture of mirrors, **25**, 933.
 ——— preparation of normal solution of sodium chloride for determining the, in a solution of the mercuric nitrate, **6**, 15.
 ——— preparation of solution of, for the precipitation of urea in urine, **6**, 21.
 ——— proto-compounds of. See Mercuric Compounds.
 ——— reflecting powers of, for the chemical rays, **17**, 77.

- Mercury, separation of, from antimony, **12**, 42.
 — specific gravity and atomic volume of, **111**, 62.
 — specific gravity of fluid, **111**, 78.
 — symbol of, in Brodie's chemical calculus, **21**, 423.
 Mercury-compound, yellow, produced by adding alcoholic potash to an alcoholic solution of mercuric chloride, **5**, 86.
 Mercury-compounds of the alcohol-radicals, formation of, **16**, 415.
 Mercury, lentes of, **14**, 313.
 Mercury-ethyl. See Mercuric Ethide.
 Mercury-methyl. See Mercuric Methide.
 Mercury-salt of Claudet's cobalt-base, **4**, 360.
 Mercury-salt of ethylene-hexethyl-diphosphonium, **14**, 101.
 Mercury-salts, osmose of, **8**, 92.
 Mercury-salts of tetrethylammonium, **4**, 311.
 Mercury selenites, **2**, 61.
 Mercury, subplatino-tersulphocyanide of, **7**, 26.
 Mercury and stibethylum, chloride of, **8**, 262.
 Mercury and stibethylum, iodide of, **8**, 261.
 Mercury and thallium, amalgam of, **17**, 146.
 Mesitilo-sulphuric acid, **2**, 113.
 Mesitilyl. See Mesitylene.
 Mesitylene, **3**, 185.
 — action of bromine on, **2**, 108.
 — action of nitric acid on, **2**, 109.
 — action of fuming sulphuric acid on, **2**, 113.
 — composition of, and some of its derivatives, **2**, 104.
 — composition and vapour-density of, **3**, 17.
 — formation of, from acetone, **25**, 438.
 — sulfo-acids of, **24**, 376.
 Mesitylene-sulphonic acids, **25**, 1019.
 Mesitylenic acid, formation of, by oxidation of mesitylene, **25**, 439.
 Mesocamphoric acid, basicity of, **25**, 146.
 Mesolite, **24**, 1018.
 Mesoxalic acid, **25**, 1001.
 Metabromotoluene, **25**, 698.
 Metacetic or Metacetic acid. See Propionic Acid.
 Metacetyl-urea, **3**, 91, 93.
 Meta-iodotoluene, **24**, 682.
 Metalamides, organo-, **12**, 89.
 Metalamines, **11**, 302; **24**, 189.
 Metalammonias. See Metalamines.
 Metaldehyde, presence of, in the "first runnings" obtained in the manufacture of alcohol from sugar-beet, **24**, 1188.
 Metaldehyde of valerianic acid, **8**, 157.
 Metallic articles, coating of, with a nearly costless, permanent, shining, black varnish, **25**, 187.
 Metallic cyanides and their combinations with cyanide of potassium, **11**, 82, 92.
 Metallic deposits in chimneys of reverberatory furnaces used for melting alloys of silver with copper and with gold, **11**, 168.
 Metallic elements, specific gravities and atomic volumes of, **111**, 59, 61.
 Metallic oxides, alleged influence of calcination on the heat of solution of, **25**, 217.
 — — specific gravities and atomic volumes of, **111**, 80.
 — — of unknown specific gravities, volumes of, **111**, 91.
 Metallic precipitations, new mode of printing upon stulls by means of, **25**, 855.
 Metallic salts, action of stannic diethyl on, **16**, 22.
 — — state of, in solution, **25**, 212.
 Metallic septa, action of, on gases at a red heat, **20**, 257.
 Metallic sulphides, decomposition of soluble, by water, **25**, 224, 672.
 Metallic vanadates, **24**, 28.
 Metallic vapours, reversal of the lines in the spectra of, **24**, 1142.
 Metalloids, mutual substitution of some, **25**, 120.
 Metal-phosphides, metal-arsides, and metal-stibides, **12**, 92.
 Metals, action of, on hydrogen peroxide, **111**, 360.
 — action of, on iodide of ethylene, **12**, 258.
 — action of sulphurous acid on certain, **24**, 656.
 — action of various, on mercuric ethide, **17**, 35.
 — coating of, with nickel and cobalt, **24**, 972.
 — colours of, **25**, 119.
 — corrosive action of sugar on, **7**, 195.
 — determination of, by electrolysis, **25**, 925.
 — discovery of a new alkali-metal by Kirchoff and Bunsen's method of analysis by spectrum observation, **13**, 287.
 — dissolution of, without chemical action, **24**, 309.
 — ductile, crystalline forms of, **13**, 334.
 — electric phenomena exhibited by

- certain, when rubbed with carbon bisulphide, **25**, 971.
- Metals**, electromotive force developed by contact of, **25**, 379.
- electro-precipitated, structure of, **11**, 300.
- estimation and separation of several, by the voltaic current, **25**, 174.
- heat produced by the combination of, with oxygen, chlorine, iodine, etc., **6**, 247.
- influence of certain liquids in retarding the action of acids upon, **25**, 116.
- melted, specific gravities of, **111**, 73, 78.
- oxidizable, construction of a battery without the use of, **1**, 142.
- accompanying platinum in the ore, researches on the, **7**, 256.
- precious, certain sources of loss of, in some operations of assaying, **13**, 97.
- a mode of precipitating all the, contained in a liquid by one operation (in chemico-legal investigations), **3**, 162.
- notes on the general routine of qualitative analysis for, **18**, 97.
- reciprocal precipitation of, **9**, 289.
- reduction of, from solution by metallic sulphides, and relation of this to the occurrence of such metals in the native state, **24**, 604.
- refraction-equivalents of, **23**, 113.
- series of organic bodies containing, **6**, 57.
- solubility of, **11**, 16.
- specific gravities of, in a finely divided state, **111**, 70, 73.
- sulphides of, **111**, 87.
- thermo-electric action of, **24**, 476.
- uniatomic, peroxides of, **16**, 290.
- Metals and alloys**, **19**, 503.
- Metals and alloys**, action of acids upon, **19**, 434.
- Metals and alloys** known to the ancients, chemical examination of, **4**, 252.
- Metals and inactive liquids**, electromotive force developed by the contact of, **25**, 662.
- Metals and other simple bodies**, atomic volumes of, **111**, 69.
- Metallumina**, soluble, preparation of, by dialysis, **15**, 248.
- Metamidobenzoic acid**, **24**, 365.
- Metanaphthalene**, **15**, 44.
- Metanitrobenzoic acid**, **25**, 710.
- Metanitrocinnamic acid**, **25**, 710.
- Metanitro-orthoacetoluide**, **24**, 683.
- Metanitro-orthotoluidine**, **24**, 683.
- Meta-ortho-tolylenediamine**, **24**, 565, 684.
- Metaperoxide of iron**, soluble, **15**, 250.
- Metaphosphates**, **111**, 273.
- Metaphosphates**, specific heat of, **19**, 201, 228.
- Metaphosphoric sulphobromide**, **25**, 984.
- Metastannic acid**, **25**, 274.
- Metastannic acid**, dialysis of, **15**, 255.
- Metastannic acid**, liquid, **17**, 325.
- Metastannic chloride**, formation of, **24**, 956.
- Metastyrol**, **11**, 347.
- Metathiohydrobenzoic acid**, **24**, 371.
- Metathuidine**, derivatives of, **24**, 563, 682.
- Metatolylacetamide**, **24**, 564.
- Metavanadates**, **21**, 340.
- Meteoric iron** from the desert of Atacama, **24**, 1180.
- — determination of combined carbon in, **25**, 604.
- — of Oviak, Greenland, **25**, 603, 796.
- — three masses of, **24**, 1020.
- — from Wisconsin, **24**, 329.
- — from Zacatecas in Mexico, **11**, 236.
- Meteoric stone** from the desert of Atacama, analysis of, **9**, 143.
- Meteoric (volcanic) dust**, examination of rain accompanied by, **25**, 1082.
- Meteorite**, Cranbourne, carbon from, **24**, 1023.
- of Danville in Alabama, **24**, 206.
- the Franklin, from Alabama, **24**, 329.
- of Sears-mont, Maine, **24**, 1180.
- from South Africa, analysis of, **22**, 22.
- from Tyube (India), **25**, 603.
- Meteorites**, **25**, 992, 993.
- geology of, **24**, 808.
- metamorphism of, **24**, 503, 504.
- mineral constituents of, **24**, 116.
- Methactone - carbonate**, ethylic, **19**, 415.
- Methacrylates**, **18**, 142.
- Methacrylic acid**, action of potassium-hydrate on, **18**, 113.
- Methacrylic acid**, formation and properties of, **18**, 142.
- Methide**, ammonia-boric, **15**, 377.
- boric, **15**, 373.
- — its compounds with potash, soda, lime, and baryta, **15**, 379.
- Methide**, mercuric, **16**, 417.
- — action of zinc upon, **17**, 30.
- Methin-trisulphonic acid**, **21**, 196.
- Methionie acid**, identity of, with disulphomethioic acid, **9**, 263.

- Methyl**, action of chlorine on an equal volume of, **3**, 338.
 — action of 2 vols. of chlorine upon 1 vol. of, **3**, 339.
Methyl of acetic ether, examination of the products derived from the substitution of ethyl for hydrogen in the, **19**, 406.
Methyl, identity of, with hydride of ethyl, **17**, 262.
Methyl acetate, absorption of its vapour by charcoal, **21**, 188.
 — oxidation of, **19**, 485.
 — preparation of, **21**, 480, 484.
 — vapour-tension of, **21**, 481, 487.
Methyl alcohol, absorption of its vapour by charcoal, **18**, 288; **21**, 190.
 — capillary transpiration of, **15**, 439.
 — conversion of formic acid into, **24**, 343.
 — physiological action of, **3**, 180.
 — preparation of, **7**, 311.
 — synthesis of, **17**, 42.
Methyl arsenate, **24**, 818.
 — arsenite, **24**, 819.
 — benzoate, oxidation of, **20**, 133.
 — bromacetate, **11**, 25.
 — bromide, action of, on aniline, **3**, 295.
 — caprate, **24**, 360.
 — chloride, Regnault's chlorinated, **22**, 260.
 — chrysanisate, **25**, 714.
 — crotonates, **18**, 140.
 — cyanate, **3**, 91.
 — cyanurate, **3**, 90.
 — diazo-amidoanisate, **18**, 314.
 — diazo-amidobenzoate, **18**, 302.
 — diethoxalate, **22**, 40.
 — diphenylallophanate, **24**, 394.
 — ether, generation of cold and fabrication of ice, by means of, **25**, 532.
 — ethylate, or ethyl methylate, **4**, 232.
 — hyposulphate, II, 364.
 — iodide, action of ammonia on, **4**, 320.
 — action of aniline on, **3**, 295.
 — action of, on diethylamylamine, **4**, 316.
 — action of, on ethylaniline, **3**, 296.
 — action of mercury upon, **6**, 65.
 — action of, upon morphine, **6**, 130.
 — action of phosphine on, **24**, 569.
Methyl iodide, action of, on potassium-alcohol, **4**, 107.
 — action of sodium-amalgam on, in presence of acetic ether, **16**, 416.
 — action of, on triethylamine, **4**, 312.
 — action of zinc upon, **6**, 62.
 — production of dimethyl by action of zinc upon, in sealed tubes, **21**, 500.
 — and methyl oxalate, action of zinc upon a mixture of, **22**, 38.
 — acetate and formate, latent heat of vapour of, **1**, 38, 39.
 — mixed with ether, action of sodium upon, **13**, 140.
 — and sodium, action of, upon acetic ether, **19**, 411.
Methyl mercuric, action of terechloride of antimony on, **16**, 22.
Methyl nitrate, **20**, 585.
 — oxidation of, **19**, 486.
 — and glacial acetic acid in presence of sulphuric acid, **22**, 189.
Methyl nitrite, **7**, 274.
 — nitroethylate, III, 435.
Methyl series, bases of the, **4**, 320.
Methyl sulphocyanate, **1**, 52.
Methyl sulphocyanate and bisulphide hyposulphimethylic and bisulphimethylic acids produced by the action of nitric acid on, **1**, 45.
Methyl trinitro-oreinate, **24**, 358.
Methylalcohol-trisulphonic acid, **25**, 403.
Methyl-allyl ether, **25**, 686.
Methylamine, action of, on the bromide of bromethyl-triethyl phosphonium, **14**, 328.
 — from bone-oil, **5**, 52.
 — obtained from caffeine, **3**, 89.
 — formation of, by the action of nascent hydrogen on cyanogen, **17**, 363.
 — formation of, by the action of potash on potassium cyanurate, **3**, 92.
 — formation of, from cotarine, **16**, 356.
 — formation of, by heating methyl alcohol with sal-ammoniac and hydrochloric acid, **25**, 248.
 — conversion of prussic acid into, **16**, 249.
Methylamine hydrochloride, **3**, 94.
 — platinohloride, **3**, 94.
Methylamylphenylamine platinohloride, **4**, 320.
Methylaniline, **3**, 295.
Methylate of sodium, reaction of, with nitrate of amyl, **20**, 583.
Methylated acetone, **19**, 416.

- Methylated phosphorus-ureas of the allyl and phenyl-series, **13**, 324.
- Methylated spirit, **8**, 128.
- Methylbenzophenone, **24**, 689.
- Methylbromacetol, formation of propyl hydride from, by the action of zinc and glacial acetic acid, **25**, 238.
- Methylbrucine, pentiodide of, **24**, 400.
- Methylbrucine, tri-iodide of, **24**, 399.
- Methylcaffeine, iodide and periodide of, **18**, 103.
- Methylcaprone, **25**, 892.
- Methylchloracetol, action of water on, **25**, 239.
- Methylchlorhydric ether, formation of, from marsh-gas, **17**, 42.
- Methyleinchonine and -cinchonidine, tri-iodides of, **24**, 399.
- Methylcrotonic acid, action of potassium hydrate on, **18**, 141.
- — — formation and properties of, **18**, 139.
- Methylexamethane, **3**, 92.
- Methylene chloride, production of, by action of chlorine on potassium acetate, **22**, 187, 191.
- — — remarks on, **22**, 262.
- Methylene iodide, **13**, 65.
- — — preparation of, **24**, 1027.
- Methylene-group of phosphorus-bases, **14**, 340.
- Methylethylamylamine, formation of, **4**, 316.
- — — platinum-salt of, **4**, 317.
- Methylethylamylphenylamine oxide, action of heat on, **4**, 319.
- Methylethylamylphenylammonium iodide, **4**, 319.
- — — platinum-salt of, **4**, 319.
- Methylethylaniline, **3**, 296.
- Methylethylene-sulphin-nitrate, **24**, 1189.
- Methylethylphenylamine, **3**, 296.
- Methylguanidine, behaviour of monochloroacetic acid to, **25**, 149.
- Methylhypogallie acid, **21**, 361.
- Methylation of the phenyl-group in aniline, **24**, 1060.
- Methylisethionic acid, formation of, **24**, 553.
- Methylmercaptan-disulphonic acid, **25**, 403.
- Methylmercaptan-trisulphonic acid, **25**, 403.
- Methyl-monobromallyl ether, **25**, 687.
- Methyl-nitrosalicyclic acid, **20**, 422.
- Methyl-norhemipinic acid, **21**, 362.
- Methyl-nornecenin, **21**, 360.
- Methyl-nornarcotine, **21**, 364.
- Methyl-noropianic acid, or monomethyl normal opianic acid, **21**, 358.
- Methylodiethylamylammonium iodide, **4**, 316.
- — — oxide, action of heat upon, **4**, 316.
- — — platinochloride, **4**, 316.
- Methylodiphenylamine, **24**, 1060, 1197.
- Methylodithionates, metallic, **10**, 245, 250.
- Methylodithionic acid, **10**, 245.
- Methylodithionic ether, **10**, 249.
- Methyl- α -naphthyl ether, **6**, 314.
- Methyl-phenylamine, **3**, 295.
- Methyl-phenyl ketone, oxidation of, **24**, 1057.
- Methyl-phosphine, **24**, 835.
- Methylphosphines, oxidation-products of, **25**, 420.
- Methyl-phosphoplatinic ether, **25**, 1090.
- Methyl-phosphoplatinous ether, **25**, 1088.
- Methylpiperidine, **6**, 179.
- Methyl-plumbethyl, **7**, 268—270.
- Methyl-propargylic ether, **25**, 687.
- Methylquinine, iodide, **7**, 279.
- Methyl-salicyl, **7**, 61.
- Methyl-salicyl hydride, **20**, 418.
- Methyl-salicyl hydride, action of acetic anhydride on, **20**, 589.
- Methyl-salicylic alcohol, **25**, 1095.
- Methyl-strychnine iodide, oxidation of, **21**, 164.
- Methyl-strychnine, tri-iodide of, **24**, 399.
- Methyl-thialdine, **10**, 194.
- Methyl-triethylammonium iodide, **4**, 313.
- Methyl-triethylammonium platinochloride, **4**, 313.
- Methyl-triethylphosphonium iodide, **11**, 71.
- Methyluramine and its derivatives, **9**, 286.
- Methyl-urea, piperidic, **6**, 178.
- Methyl-valeral, isomeric with isoprop-acetone, **20**, 112.
- Metohudine, platinum-salt of, **3**, 156.
- Metohudine, preparation and analysis of, **2**, 155.
- Metropolitan sewage. See Sewage.
- Metropolitan waters, chemical composition of the, during the autumn and winter of 1854, **8**, 97.
- Mica of adamellogranite, **25**, 602.
- Mica, method of colouring, **24**, 862.
- Micromineralogy, contributions to, **25**, 294.
- Microscope, preservation of crystallised salts for the, **11**, 71.
- Microscopical research in relation to pharmacy, **18**, 34.
- Mignonette, allyl sulphocyanate a constituent of the root of, **25**, 172.

- Milk, analysis of, **24**, 165.
 — analysis of, by the ammonia process, **25**, 1044.
 — analysis of woman's, **25**, 513.
 — composition of, and preparation of artificial, **24**, 865.
 — condensed, **24**, 165.
 — constitution of, **24**, 838.
 — of the cow, changes in the composition of the, **1**, 174.
 — formation of, in the animal economy, **1**, 469.
 — influence of the addition of calcium phosphate in the food on the composition of the ash of, **25**, 837.
 — influence of food on the production of, in the cow, **24**, 414.
 — microscopical appearance of sweet and skim, **25**, 1106.
 — quantities of ammonia evolved from, by potash and by permanganate, **25**, 646.
 — researches on, **25**, 258.
 Milk and white-of-egg spots, distinction between, **25**, 646.
 Milk-sugar, alcoholic fermentation of, **25**, 316.
 — — — nitrogenous compounds from, **25**, 71.
 — — — reaction of, with acetic anhydride, **25**, 70.
 — — — in a vegetable juice, **24**, 915.
 Millerite, **24**, 1176.
 Mill-products of wheat grain, percentage of nitrogen in, **10**, 30.
 Mineral, new, from Burmah, **24**, 114.
 Mineral, new, from Leadhills, **24**, 500.
 Mineral manures and ammonia salts, different effects of, as fertilisers, **24**, 283.
 Mineral matter of plants, **25**, 642.
 Mineral veins, connection of certain phenomena with the origin of, **25**, 123.
 Mineral waters. See Waters.
 Mineralogical contributions, **11**, 236.
 Mineralogical notices, **24**, **1**; **25**, 1049.
 Mineralogy, contributions to, **25**, 289.
 Minerals, additional experiments on the density of certain, **17**, 415.
 — amounts of barium and manganese in some, **24**, 1177.
 — decomposition of, by sodium and potassium, **24**, 1210.
 Minerals, new method of obtaining crystalline substances in the "dry way," and on the application of this method to the production of artificial, **1**, 181.
 Minerals, Cornish, new and rare, **18**, 159; **19**, 130; **23**, 3.
 Minerals from Elba, **25**, 991.
 Mint, oil of, **17**, 11.
 Mississippi Passes, mul-lumps of the, **24**, 675.
 Mixed gases, absorption of, in water, **17**, 88.
 Mixed gases, diffusion of, into a vacuum, with partial separation, **17**, 350.
 Mixture and solution: their influence on the specific refractive energy of elements and their compounds, **18**, 110.
 Molasses, analysis of, **24**, 762.
 — part played by salts and uncrystallisable sugar in the generation of, **24**, 456.
 — recovery of sugar from, by baryta, **25**, 185.
 Molasses casks, increase in the weight of, occasionally arising from absorption, **6**, 122.
 Molecular and chemical actions, researches on the quantities of heat disengaged in, **6**, 234.
 Molecular dissociation by heat of compounds in solution, report on, **25**, 120.
 Molecular weights of saline substances, an attempt to determine, **25**, 1068.
 Molecules of a body, re-arrangement of the, after solidification, **1**, 77.
 Molecules, existence of, **22**, 340.
 Mollusca, presence of hæmoglobin in the muscles of, **25**, 255.
 Molybdate of ammonium, precipitation of small quantities of phosphoric acid by, **24**, 157.
 Molybdates, specific heat of, **19**, 200, 227.
 Molybdates of lead, **24**, 500.
 Molybdenum, compounds of, **1**, 393.
 — determination of the atomic weight of, **1**, 395.
 — specific gravity and atomic volume of, **111**, 61.
 Molybdenum oxide, specific gravity and atomic volume of, **111**, 83.
 Molybdenum sulphide, specific gravity and atomic volume of, **111**, 89.
 Molybdic acid, atomic volume and specific gravity of, **111**, 83.
 — — — basicity of, **24**, 199.
 — — — determination of, as plumbic molybdate, **24**, 758.
 — — — liquid, **17**, 326.
 — — — note on Fresenius's process for the recovery of, from residues, **25**, 264.
 — — — recovery of, from residues, **24**, 1092.

- Molybdic acid, use of, in dyeing, **55**, 186.
 ——— utilisation of, for the colouring of silk, **24**, 867.
- Molybdic and phosphoric acids, combinations of, **1**, 394.
- Molybdic trioxide, action of phosphorous chloride on, **25**, 223.
- Monacetorosaniline, **24**, 1062.
- Monallylin, **25**, 398.
- Monamides, primary, **12**, 63.
 ——— secondary, **12**, 66.
 ——— tertiary, **12**, 71.
- Monamidic acids, quartary, **12**, 103.
 ——— tertiary, **12**, 100.
- Monamines, primary, **11**, 255.
- Monamines, secondary, **11**, 258.
- Monamines, secondary, of the aromatic series, **25**, 1025.
- Monamines, secondary, formation of, by the action of bases having the formula, $C_nH_{2n-7}.H_{2n}$, **24**, 1059.
- Monamines, synthesis of aromatic, by intramolecular atomic interchange, **25**, 1021.
- Monamines, tertiary, **11**, 259.
- Monazite, **24**, 324, 506.
- Monethylphosphine, **24**, 715.
- Mono-acetyl-saccharose, **25**, 69.
- Monobasic and bibasic acids, distinction between, **11**, 127.
- Monobenzyl urea, **24**, 928; **25**, 448.
- Monobromallyl acetate, **25**, 686.
- Monobromallyl-ethyl ether, **25**, 479.
- Monobromethylene, action of zinc-ethyl on, **20**, 28.
- Monobromethylene, metamorphosis of, **13**, 68.
- Monobromobenzoic acid, **24**, 363.
- Monobromobenzoic acid, transformation of, into isophthalic acid, **24**, 367.
- Monobromophenetol, **24**, 1040.
- Monobromothymoquinone, **24**, 352.
- Monobromotoluenes, action of sodium on the two isomerie, **24**, 684.
- Monobromo- and monochloropropylene, action of water on, **25**, 238.
- Monobutyrin, **6**, 285.
- Monocarbon acids, their conversion into dicarbon acids, **17**, 109.
- Monochloracetate, phenylic, **25**, 144.
- Monochloracetic acid, behaviour of, to methylguanidine and similar compounds, **25**, 149.
- Monochloracetic acid, preparation of, **17**, 398.
- Monochlorallyl sulphocyanate, **25**, 479.
- Monochlorallyl-ethyl ether, **25**, 479.
- Monochlorethoxyl-ethylene, **24**, 515.
- Monochlorhydrin of glycol, action of sulphuric acid on, **24**, 125.
- Monochlorides of diatomic and bibasic acids, **24**, 820.
- Monochlorinated ethyl chloride, **24**, 923.
- Monochlorocitramalic acid, origin and properties of, **25**, 78.
- Monochlorocrotonamide, **24**, 1047.
- Monochlorocrotonic acid, **24**, 1046.
- Monochlorocrotonic acid obtained from crotonic chloral, **25**, 689.
- Monochlorocrotonic chloride, **24**, 1047.
- Monochlorocrotonitrile, **25**, 690.
- Monochlorodibromobutyric acid, **25**, 690.
- Monochloro-dinitrophenols, **24**, 249.
- Monochloro-mononitrophenols, **24**, 249.
- Monochloronaphthalene, **25**, 64.
- Monochlorotetracrylic acid, **24**, 813.
- Monoethylphosphine, **24**, 569.
- Monoglycerides, **12**, 243.
- Monohydrate, perchloric, **16**, 86.
- Monomargarin, **6**, 284.
- Monomethyl normal meconin, **21**, 360.
- Monomethyl-phosphinic acid, **25**, 420.
- Mononitro-anisol, **3**, 74.
- Mononitro-anthracene, **24**, 222.
- Mononitrochrysene, **24**, 693.
- Mononitronaphthalene, **24**, 695; **25**, 699.
- Mononitroresorcin, **24**, 831; **25**, 1006.
- Mononitroxylene, **3**, 184.
- Monopalmitin, **6**, 284.
- Monophosphonium compounds, **14**, 78.
- Monostearin, **6**, 282.
- Monosulphodiphenylic acid, **24**, 1053.
- Monothallous phosphate, **25**, 988.
- Monotolyl-oxamide, **16**, 198.
- Monotolyl-urea, **16**, 190.
- Monovalerin, **6**, 285.
- Monovanadates, **21**, 339.
- Monoxethyl-chlorhydrin, **25**, 686.
- Monoxybenzoyl sulphur-urea, **24**, 571.
- Mont-Blanc, composition of the air of, **13**, 22.
- Montebrasite, **24**, 892; **25**, 793.
- Montebrasite, identity of, with amblygonite, **25**, 126.
- Monticellite, **24**, 506.
- Monzonite, a new mineral species, **24**, 1178.
- Moors (Landes) of Brittany, chemical studies on the, **25**, 320.
- Mordanting of cotton with the acetates of iron and of alumina, **16**, 6, 408.
- Mordanting of cotton with monomuriate of alumina, **16**, 210.
- Mordanting of cotton with oxychloride of iron, **16**, 413.
- Mordenite, a new mineral from the trap of Nova Scotia, **17**, 100.
- Morin, red compound obtained by heating, with phthalic anhydride and sulphuric acid, **24**, 912.
- Morindone, **17**, 333.

- Morphine, **15**, 450.
 — action of amyl chloride on, **6**, 132.
 — action of chloride of lime and hydrochloric acid on, **24**, 265.
 — action of ethyl iodide on, **6**, 126.
 — action of hydriodic acid on, **25**, 504.
 — action of methyl iodide on, **6**, 130.
 — action of nitrous acid on, **24**, 264.
 — action of phosphoric acid on, **25**, 652.
 — action of zinc chloride on, **24**, 264.
 — compound of, with iodide of mercury, **11**, 99.
 — estimation of, in opium, **25**, 180, 181.
 — oxidation of, **21**, 164.
 — polymerisation of, **25**, 506.
 — reactions of, **25**, 1013.
 Morphine acetate, decomposition of, in solution, **24**, 148.
 Morphine hydrochloride, diffusion of, **4**, 104.
 Morphine meconate, microscopical appearance of, **18**, 36.
 Morphine sulphate, microscopical appearance of, **18**, 36.
 Morphine and narcotine, two derivatives of, **1**, 408.
 Morphine and strychnine, detection of, in presence of one another, **24**, 443.
 Mortars and cements, origin of the hydraulic power of, **25**, 528.
 Moths, protection of cloth and other material from, **25**, 856.
 Motion, atomic, **4**, 110.
 Motion and equilibrium, with special reference to the diffusion of gaseous mixtures, **24**, 884.
 Mould, action of, on sugar-solutions, **23**, 391.
 Mountain-ash, sorbin, a new saccharine substance extracted from the berries of the, **5**, 281.
 Mountain-ash berry, volatile organic acids of, **12**, 43.
 Mountain limestone of Skipton, composition of, **25**, 535.
Mucedinea, pretended transformation of, into alcoholic ferments, **25**, 261.
 Mucin of the sub-maxillary gland, **24**, 949.
 Mucous tissue of the umbilical cord, **25**, 311.
 Mucus, animal, dialysis through, **15**, 242.
 Mud of irrigation canals, nitrous acid in, **24**, 950.
 Mud of the Nile, analysis of, **25**, 644.
 Mud by matter, precipitation of, by weak saline solutions, **24**, 750.
 Mud-lumps of the Mississippi Passes, **24**, 675.
 Mulberry-leaves, composition of, **25**, 1035.
 Mulberry-leaves from Turkestan, **24**, 435.
 Mulberry-tree, composition and distribution of the inorganic substances in the different organs and component organic parts of the, **1**, 103.
 — — preparation of the ashes of the component parts of the organs of the, **1**, 108.
 — — table showing the composition per cent. of the ashes of the component parts of the organs of the, after deducting the carbonic acid, **1**, 113.
 — — table showing the proportion of ash obtained from the dried organs and organic parts of the, **1**, 112.
 — — table showing the ratio of the cellulose to the other organic parts of the, **1**, 111.
 Multiple proportions, law of, its relation to the atomic theory, **22**, 334—340.
 Murexid, spectroscopic characters of the ammoniacal solutions of, **24**, 1096.
 Muriate (chloride) of tin, single and double, **4**, 245.
 Muratic acid, action of, upon tannin, **1**, 137.
 Muscarine, a vegetable base contained in *Agaricus muscarius*, **25**, 829.
 Muscle, preparation of glycogen from, **25**, 84.
 Muscular activity, relation of glycogen to, **23**, 156.
 Muscular fibre, striped, condition of doubly refractive substance of, **24**, 735.
 Muscular flesh, fibrin of, **3**, 188.
 Muscular power, origin of, **21**, 33.
 Muscular tissue, distribution of albumin through, **17**, 405.
 Muscular tissue, nutrition of, **24**, 514.
 Muscular tissue, quantity of nitrogen in, **25**, 512.
 Must, aëration of, **24**, 458.
 Must, effects produced by the addition of plaster of Paris to, **20**, 403.
 Mustard, detection of turmeric in yellow, **24**, 761.
 Mustard-oil, chlorinated and iodated phenylic, **25**, 510.
 Mustard-oil, compounds of, with alkaline hydrosulphates, **8**, 183—186.
 Mustard-oil, practical observations on, **24**, 835.
 Mustard-seed, white, new constituent of, **24**, 408.

Mustard, white and black, examination of the oils expressed from the seeds of, **2**, 96.

Mutton-stearin, composition of, **5**, 304--5.

Mycomelic acid, constitution of, **25**, 250.

Myelin, **25**, 989.

Myricin, analysis of, **1**, 249.

Myristicene, **25**, 3.

Myristicol, **25**, 11.

Myrobalans, the fruit of *Terminalia Chebulata*, examination of, **1**, 210.

Myrrh, oil of, **17**, 11.

Myrtene, **25**, 3.

Myrtle, oil of, **17**, 11.

Myrtus Pimento, essential oil of, **25**, 2.

N.

Nadorite, **24**, 1178.

Namaqualite, **23**, 1.

Napelline, **25**, 305.

Naphtha, light coal, examination of, **1**, 252.

Naphthalene, absorption of its vapour by charcoal, **21**, 189.

— constitution of, **25**, 442.

— constitution of isomeric mono-substitution products of, **25**, 82.

— derivatives of, **8**, 303; **25**, 64, 698.

— formation of, from marsh-gas, **17**, 44.

— formation of pyridine from, **18**, 9.

— refraction-equivalent of, **23**, 151.

Naphthalene colours, **14**, 246.

Naphthalene of commerce, pure, **25**, 306.

Naphthalene group, aldehyde of the, **24**, 1057.

Naphthalene tetrachloride, **25**, 64.

Naphthalenes, dichloro, α and β , **25**, 65.

Naphthalene-carboxylic acid, amide of, **25**, 624.

Naphthamein, **14**, 248.

Naphthazarin, **24**, 355, 356, 698.

Naphthene-diamine, **18**, 181.

α -Naphthol colours, **24**, 911.

Naphthol-compounds, **24**, 1041.

β -Naphthol, nitration of, **24**, 255.

Naphthol, quinone-derivatives of, **25**, 241.

Naphthol, reactions of, with oxalic acid, phthalic anhydride, and pyromellitic acid, **24**, 1042.

Naphthoquinones, **23**, 135.

Naphthylamine, action of acids on, **19**, 329.

Naphthylamine, action of chloride of cyanogen on, **9**, 8.

— action of nitrous acid on, **19**, 135.

— derivatives of, **16**, 207.

— formation of, from azodinaphthyl-diamine, **18**, 181.

— preparation of, **9**, 88.

Naphthylamine hydrochloride, action of aniline and toluidine on, **24**, 1059.

Naphthylamines, secondary, **25**, 1025.

α -Naphthylcarboxylic acid, oxidation of, **24**, 920.

Naphthyl-compounds, table of, **4**, 55.

Naphthyl cyanate, **24**, 139.

Naphthyl-diamine, **18**, 175.

— behaviour of, with oxidising agents, **18**, 178.

— hydrochloride, **18**, 176.

— nitrate, **18**, 178.

— oxalate, **18**, 178.

— sulphate, **18**, 177.

Naphthyl-phenylamine, **24**, 1059.

Naphthyl-purpuric acid, **24**, 238.

Naphthyl-purpuric acid, new blue colouring matter derived from, **25**, 251.

Naphthyl-urethane, **24**, 139.

Narceine, **5**, 258; **15**, 452.

— microscopical characters of, **18**, 37.

— use of phenol for detecting, **25**, 331.

Narcogenin, **11**, 173.

Narcotine, **15**, 452; **25**, 723.

— action of hydrochloric and hydriodic acids on, **24**, 363.

— action of nitric acid on, **5**, 261.

— atomic weight of, **11**, 163.

— composition of, **11**, 163, 165; **16**, 343.

— conversion of, into cotarnine and opianic acid, by oxidation, **16**, 345.

— microscopical characters of, **18**, 36.

— products of decomposition of, **11**, 168, 177.

— rational formula of, **16**, 364.

— researches into the chemical composition of, and of its products of decomposition, **16**, 342; Part II, **21**, 357.

Narcotine and morphine, two derivatives of, **1**, 408.

Nascent hydrogen: its action on opianic acid, **16**, 347.

Nascent hydrogen: its action on oxalic acid, **16**, 304.

Natal aloes, action of nitric acid on, **25**, 153.

Nephrite, **24**, 324, 673.

Neroli, oil of, **17**, 11.

Neutralisation, heat of, **24**, 875.

- Neutralisation of potassium hydrate by nitric, hydrochloric, and sulphuric acids, heat disengaged in the, **II**, 52, 58.
- Neutralisation of various acids and acid salts by potash, heat disengaged in the, **II**, 51—68.
- Newcastle coal-mines, composition of the fire-damp of the, **III**, 7.
- New Holland, yellow gum-resin of, **III**, 10.
- New River water, analysis of, **4**, 378.
- Nicholson or alkali blue on wool, **25**, 1140.
- Nickel, action of ammonium sulphhydrate on, **25**, 982.
- atomic weight of, **16**, 58; **22**, 300; **24**, 1006.
- coating of metals with, **24**, 972.
- determination of, by the battery, **24**, 1091.
- modification of the reactions of, by citric acid, **10**, 114.
- occurrence of, in lead, and its concentration by Pattinson's process, **17**, 377.
- quantitative separation of, from potash and soda, **2**, 99.
- separation of, from cobalt, **1**, 187.
- separation of, from zinc, **24**, 955.
- solubility of, **II**, 20.
- specific gravity and atomic volume of, **III**, 59, 71.
- testing of, with potassium ferri-cyanide, **24**, 757.
- Nickel carbonates, **14**, 51.
- chromate, **24**, 108.
- hyposulphite, **23**, 430.
- metaphosphate, **III**, 276.
- methylodithionate, **10**, 250.
- monoxide and sesquioxide, specific gravities and atomic volumes of, **III**, 81.
- oxide, detection of small quantities of cobalt in, **4**, 361.
- — discovery of pure, in the scum arising from smelting of copper, **II**, 384.
- peroxide, volumetric estimation of, **8**, 230.
- phosphite, **20**, 365.
- pyrophosphotriamate, **19**, 9.
- salts, osmose of, **8**, 89.
- selenites, **2**, 64.
- subsulphide, specific gravity and atomic volume of, **III**, 88.
- sulphites, **III**, 295.
- Nickel, lead, manganese and cobalt, volumetric estimation of the peroxides of, **8**, 230.
- Nickel-gymnite from N. Carolina, analysis of, **25**, 681.
- Nicotine, amount of, in snuff and tobacco, **24**, 1075.
- not present in tobacco-smoke, **24**, 1077.
- oxidation of, **21**, 165.
- Nigella seeds, or black cummin, **24**, 1067.
- Nightshade, deadly, distribution of atropine in the leaves and root of, **25**, 1101.
- Night violet, **25**, 531.
- Nile mud, analysis of, **25**, 643.
- Nile river, analysis of sediment deposited from, **4**, 143.
- Nile water, general characters of, **4**, 148.
- Nile water, hardness of, **4**, 149.
- Ninaphthylamine, **12**, 153; **14**, 247.
- Ninaphthylamine hydrochloride, **12**, 154.
- Ninaphthylamine platinochloride, **12**, 155.
- Ninaphthylamine sulphate, **12**, 154.
- Nine-carbon ether, **6**, 312.
- Niobates, natural, composition of, **25**, 189.
- Niobates, natural, estimation and separation of metallic acids in, **25**, 193.
- Niobic acid crystallised from fused borax, **24**, 806.
- Niob compounds, composition of, **24**, 1013.
- Niobite. See Columbite.
- Niobium, compounds of, **24**, 807; **25**, 291.
- Niobium, separation of, from tin, titanium and tungsten, **25**, 193, 194.
- Nitraniline, **I**, 172; **II**, 382; **III**, 111; **17**, 160.
- action of ethyl bromide on, **3**, 292.
- composition of, **III**, 120.
- compounds of, **III**, 122.
- preparation of, **III**, 119.
- products of decomposition of, **III**, 121.
- properties of, **III**, 121.
- Nitraniline, a third, **21**, 418.
- Nitraniline hydrochloride, **8**, 176.
- Nitraniline nitrate, **8**, 177.
- Nitraniline sulphate, **8**, 177.
- Nitraniline and paranitraniline, **8**, 175.
- Nitranisic acid, action of ammonia on, **25**, 1024.
- Nitranisidine, **3**, 75; **19**, 68.
- Nitrate of allantoin, **24**, 1198.
- of ammonium, absorption of, by ferric oxide, **21**, 12.
- of amyl, action of zinc-ethyl on, **21**, 174.
- preparation and reactions of, **20**, 581.
- Nitrate of arsenic triethyl, **7**, 266.

- Nitrate of berberine, **15**, 349.
 — of biamidobenzoic acid, **9**, 372.
 — of colicine, **4**, 114.
 — of didymium, **6**, 266.
 — of dipyrindine, **22**, 411.
 — of ethyl, oxidation of, **19**, 486.
 — of ethyl, preparation and reactions of, **20**, 584.
 — of ethyl, vapour-density of, **15**, 153.
 — ethyl-mercureic, **5**, 88.
 — of lophine, **9**, 224.
 — of menaphthalamine, **9**, 11.
 — of methyl, oxidation of, **19**, 486.
 — of methyl plumbethyl, **7**, 270.
 — — preparation and reactions of, **20**, 385.
 Nitrate of narcine, **5**, 259.
 — of paranitraniline, **8**, 178.
 — of piperidine, **6**, 177.
 — of potassium, absorption of, by alumina, **21**, 11.
 — — absorption of, by ferric oxide, **21**, 9.
 Nitrate of quinine, **7**, 278.
 — of selenethyl, **7**, 94.
 — of silver, action of bromine-water on, **15**, 479.
 — — its action on cyanide of ethylene, **15**, 137.
 — — alkaline reaction of, **24**, 109.
 — — compound of, with lophine, **9**, 225.
 — — corrosion of copper plates by, **24**, 1008.
 — — decomposition of, by heat, **1**, 189.
 Nitrate of sodium, loss of, by drainage, **24**, 292.
 — of stibethyl, **5**, 69.
 — of stibmethylum, **5**, 68.
 — of stibtriamyl, **9**, 284.
 — of stibtriethyl, **9**, 281.
 — of sulphur-urea, **22**, 6.
 — of tellurethyl, **5**, 72.
 — of thallium, **17**, 141; **25**, 988.
 — of triethyl-sulphyl, **17**, 105.
 — of urea, compounds of, with mercuric oxide, **6**, 5—7.
 Nitrates, **II**, 435.
 — amounts of, in spring, brook, river, and lake-water, **25**, 786.
 — decomposition of, by heat, **III**, 352.
 — diffusion of, **4**, 90—104.
 — estimation of, by solution of indigo, **25**, 922.
 — origin of, in potable waters, **24**, 61.
 — specific heat of, **19**, 226, 228.
 — tests for, and a new one for nitrites, **4**, 151.
 Nitrates, volumes occupied by certain, **II**, 440.
 Nitrates, alcoholic, action of hydriodic acid on, **20**, 169.
 Nitrates of bismuth and copper, **III**, 480.
 Nitrates, mercurous and mercuric, compounds of, with tyrosine, **22**, 283.
 Nitrates and carbonates, action of boracic acid on, **12**, 165.
 Nitration of chloroform, **24**, 641.
 Nitration-products of the dibromophenol-sulphonic acids, **25**, 857.
 Nitration-products of the dichlorophenol-sulphonic acids, **25**, 93.
 Nitrazophenylamine, **14**, 242.
 Nitre, contributions to the history of nitric acid, with especial reference to the valuation of, **9**, 97.
 — — rough notes on the formation of, as observed in the north-western provinces of India, **21**, 318.
 — — valuation of, **10**, 107.
 Nitric acid, action of, on amyl sulphocyanate, **1**, 375.
 — — action of, on anthracene, **15**, 48.
 — — action of, on aporetin, **10**, 306.
 — — action of, on benzoic acid, **18**, 322.
 — — action of, on bisulphochloride of amylene, **13**, 45.
 — — action of, on brasses, **19**, 441, 443.
 — — action of, on bronzes, **19**, 450.
 — — action of, on brucine, **1**, 192.
 — — action of, on carminic acid, **III**, 469.
 — — action of, on Chinese wax, **10**, 167.
 — — action of, on chloraniline, **II**, 283.
 — — action of, on codeine, **4**, 115.
 — — action of, on cotamine, **5**, 266.
 — — action of, on cyanide of ethylene, **15**, 137.
 — — action of, on cymene, **III**, 421.
 — — action of, on datisine and datisetine, **9**, 232.
 — — action of, on diazo-amido-benzoic acid, **18**, 308.
 — — action of, on dichlorophenol-sulphonic acids, **24**, 1112.
 — — action of hydrogen on, **24**, 885.
 — — action of, on iron, **22**, 141, 148.

- Nitric acid, action of, on melaniline, **1**, 304.
 ——— action of, on mesitylene, **2**, 109.
 ——— action of, on metastyrol, **11**, 351.
 ——— action of, on narcotine, **5**, 261.
 ——— action of, on Natal aloes, **15**, 153.
 ——— action of, on opianyl, **9**, 274.
 ——— action of, on papaverine, **8**, 283.
 ——— action of, on paraffin, **21**, 469.
 ——— action of, on propione, **4**, 6.
 ——— action of, on the resin of *Xanthorrhæa hastilis*, **111**, 12.
 ——— action of, on styrol, **11**, 339.
 ——— action of, on sycoretin, **15**, 66.
 ——— action of, on tartanil and tartanilide, **8**, 181.
 ——— action of, on theine, **1**, 219.
 ——— action of, on tyrosine, **22**, 286.
 ——— action of, on various vegetables, **4**, 213.
 ——— aqueous, of constant boiling-point, composition of, **13**, 147.
 ——— aqueous, specific gravities and volumes of, **111**, 171.
 ——— capillary transpiration of, **15**, 431.
 ——— comparative experiments on the delicacy of the sulphate of aniline and brucine reactions for, **24**, 441.
 ——— compound of, with sulphuric acid, **24**, 656.
 ——— containing lower oxides of nitrogen, action of, on silver chloride blackened by light, **25**, 455.
 ——— contributions to the history of, with especial reference to the valuation of nitre, **9**, 97.
 ——— decolorising action of, on red wines, **25**, 853.
 ——— decomposition of brucine by, **7**, 273.
 ——— decomposition of, by heat, **25**, 35.
 ——— decomposition of, by indigo in contact with alumina, chromic oxide, or stannic oxide, **111**, 354.
 ——— detection of, **16**, 396.
 ——— detection of, by means of brucine, **24**, 581.
 ——— diffusion of, **4**, 87.
 ——— estimation of, **1**, 281; **12**, 35; **24**, 753; **25**, 323, 324.
 ——— estimation of, in potable waters, **21**, 172; **24**, 754; **25**, 922.
 Nitric acid, formation of, in eudiometric combustion of gases mixed with nitrogen, **111**, 245.
 ——— fuming, action of, on naphthalamine, **9**, 12.
 ——— heat-phenomena accompanying the introduction of, into organic compounds, **24**, 871.
 ——— hydrates of, **111**, 399.
 ——— hyposulphethylic, hyposulphimethylic, bisulphimethylic, and bisulphimethylic acids produced by the action of, on the sulphocyanates and bisulphides of ethyl and methyl, **1**, 45.
 ——— influence of marl on the formation of, in soil, **24**, 751.
 ——— loss of gold in parting operations from its solubility in, **13**, 99.
 ——— modification of Schloesing's apparatus for determining, **24**, 439.
 ——— osmose of, **8**, 58.
 ——— products of the action of, on castor oil, **1**, 1.
 ——— products of the oxidation of cymene by, **111**, 441.
 ——— quantitative determination of, **1**, 281.
 ——— simultaneous action of, and of sulphuric acid on benzoic acid, **18**, 325.
 ——— simultaneous action of, and of sulphuric acid on β -nitrobenzoic acid, **18**, 326.
 ——— solubility of lead sulphate in, **15**, 59.
 ——— solubility of silver chloride in strong, **25**, 453.
 ——— substitution-compounds obtained by the action of, on cotton, **7**, 201.
 ——— toxicology of, **24**, 1078.
 ——— use of, in eudiometry, **4**, 222.
 ——— vapour-density of, **15**, 154.
 ——— in water, delicate test for, **25**, 324.
 ——— in well-water at Highgate, **4**, 21.
 Nitric acid and chlorine gas, action of, upon the platino-sulphocyanides, **7**, 40.
 Nitric and nitrous acids, estimation of, in potable waters, **21**, 85, 101.
 Nitric and nitrous acids, method of determining, **15**, 381.
 Nitric anhydride and a new nitric hydrate, **25**, 1072.
 Nitric ethers, action of, on acetic acid, **22**, 188.
 ——— formation of, from the corresponding alcohols, **24**, 1036.
 ——— heat evolved in the formation of, **24**, 871.
 ——— reaction of, with valerianic

- acid in presence of sulphuric acid, **22**, 190.
- Nitric oxide, its action upon binoxide of sodium, **14**, 287.
- — — its action upon tetroxide of potassium, **14**, 288.
- — — conversion of, into ammonia by hydriodic acid, **20**, 169.
- — — estimation of, by means of hydriodic acid, **20**, 167.
- Nitride of benzoyl, formation of, from hippuric acid, **7**, 191.
- Nitride of boron, **3**, 167.
- Nitride of silicon, **11**, 95.
- Nitrides of vanadium, **21**, 349.
- Nitrification, facts for the history of, **25**, 465.
- Nitrification, natural, **24**, 1000.
- Nitrile bases, **3**, 96.
- Nitrile bases, table of, **4**, 326.
- Nitriles, preparation of, **25**, 1020.
- Nitriles and amides, action of sulphuric acid on, **9**, 241.
- Nitrite of ammonium, formation of, in combustion and in vital processes, **25**, 35.
- — — of amyl, **11**, 245 ; **25**, 1092.
- — — action of nascent hydrogen upon, **11**, 247.
- — — action of phosphorus upon, **11**, 250.
- — — action of potassium and chlorine upon, **11**, 248.
- — — action of zinc-ethyl on, **21**, 174.
- — — some decompositions of, **19**, 336.
- — — decomposition of, by hydriodic acid, **20**, 578.
- — — oxidation of, **19**, 486.
- — — preparation and reactions of, **20**, 576.
- Nitrite of bichloramyl, **11**, 249.
- Nitrite, mercurous, compound of, with tyrosine, **22**, 283.
- Nitrite of methyl, **7**, 274.
- Nitrite of potassium, action of, on ethyl chloracetate, **25**, 608.
- Nitrite of silver, action of heat on, **24**, 85.
- Nitrites, **1**, 384.
- — — estimation of, by solution of indigo, **25**, 922.
- — — estimation of, in waters, **18**, 127.
- — — production of the sulphates of the alcohol-radicals from the, by means of sulphurous acid, **23**, 415.
- Nitrites of amyl, isomeric, **25**, 474.
- Nitro-acetides, **24**, 710.
- Nitroamidobenzoic acid, formation of, from nitro-uramidobenzoic acid, **25**, 498.
- Nitro-anthracenes, **24**, 222.
- Nitrobenzamide, **III**, 411.
- Nitrobenzanisidide, **3**, 76.
- Nitrobenzene, **17**, 158.
- — — absorption of its vapour by charcoal, **21**, 189.
- — — action of alkalis on, **25**, 620.
- — — detection of, in bitter almond oil, **25**, 843.
- — — estimation of, in bitter almond oil, **25**, 1127.
- — — heat of combustion of, **24**, 871.
- — — heat evolved in the formation of, **24**, 873.
- — — ready liberation of hydrocyanic acid from, **25**, 693.
- Nitrobenzoates, hydric, **19**, 364, 368.
- — — *a*-hydric and barytic, action of heat on, **19**, 369.
- Nitrobenzoic acid, **II**, 343 ; **18**, 319 ; **19**, 363.
- — — heat evolved in the formation of, **24**, 874.
- — — preparation of, **9**, 268.
- Nitrobenzyl mercaptan, **25**, 1027.
- Nitrocarbol, **25**, 997.
- Nitrochlorophenols, constitution of, **24**, 248.
- — — observations on the, **25**, 12.
- Nitrochlorophenolsulphonic acid, **24**, 1120.
- Nitrochrysene, **24**, 693.
- Nitrocinmanisidide, **3**, 76.
- Nitrococcinic acid, **III**, 469.
- Nitrocodeine, **4**, 115.
- Nitro-compounds, **17**, 153 ; **18**, 319 ; **19**, 363.
- Nitro-compounds, aromatic, formation of, in alcoholic solution, **24**, 222.
- Nitro-compounds of the fatty series, **25**, 804.
- Nitrocoumarin, **III**, 213 ; **8**, 301.
- Nitrodibromobenzene, action of ammonia on, **25**, 1003.
- Nitrodibromotoluene, **24**, 1062.
- Nitrodichlorophenol, **24**, 246.
- Nitro-erythroglycerin, **16**, 299.
- Nitroethyl, **24**, 1036.
- Nitroethane, **25**, 682, 804.
- Nitroethyl-salicyl hydride, **20**, 424.
- Nitrogen, action of electric discharge on, **13**, 361.
- — — actual or possible sources of, in crops, **16**, 107.
- — — affinity of, for hydrogen, **25**, 215.
- — — of the albuminoids decomposed in the body, excretion of the, **24**, 943.
- — — amount of, in black tea, **25**, 1034.
- — — amount of, reckoned as ammonia, and estimated value of total constituents in human voidings, **19**, 96.

- Nitrogen**, analysis of organic substances containing, **1**, 41 (p).
- annual yield of, per acre, in different crops, **16**, 102.
 - atmospheric action of, in vegetation, **25**, 161.
 - — part played by, in the formation of ammonia, **1**, 51.
- Nitrogen**, atomicity of, **25**, 982.
- behaviour of triethylphosphine with sulphide of, **13**, 302.
 - in carbonaceous substance existing in grey cast-iron, **14**, 201.
 - in coal, **24**, 899.
 - compounds in which hydrogen is replaced by, **18**, 268, 298; **19**, 57; **20**, 36.
 - compounds of phosphorus containing, **22**, 15.
 - Dumas' method of determining, **22**, 293.
 - effect of diet and exercise on the elimination of, **24**, 412.
 - electric spectra of metals in, **17**, 87.
 - estimation of, **1**, 19, 381.
 - estimation of, by combustion with soda-lime, **16**, 142.
 - estimation of, in gun-cotton, **20**, 336.
 - estimation of, in the form of nitrates and nitrites in potable waters, **21**, 101.
 - estimation of, in organic analysis, **1**, 44 (p).
 - estimation of, in organic compounds, **1**, 197.
 - estimation of, in organic compounds, observations on Reiset's remarks on the, **1**, 51.
 - estimations, table for the calculation of direct, **18**, 210.
 - evolution of, in alcoholic fermentation, **25**, 572.
 - formation of nitric acid in endiometric combustions of gases mixed with, **11**, 245.
- Nitrogen**, free, experiments on the assimilation of, by plants, **16**, 100, 112, 118, 125, 126, 127.
- — experiments on the assimilation of, in which the plants had no supply of combined nitrogen beyond that contained in the seed sown, **16**, 170, 177.
 - — experiments on the assimilation of, by buckwheat, **16**, 176.
 - — experiments on the assimilation of, by graminaceous plants, **16**, 171, 178.
 - — experiments on the assimilation of, by leguminous plants, **16**, 175, 183.
- Nitrogen**, free, experiments to determine whether it combines with hydrogen evolved from decomposing organic matter, **16**, 168.
- — experiments to determine whether it is evolved during the decomposition of nitrogenous organic compounds, **16**, 155.
- Nitrogen** group, spectra of bodies belonging to the, **24**, 1115.
- Nitrogen**, heat evolved in the formation of, **24**, 1001.
- heat of formation of the oxygen-acids of, **25**, 781.
 - heat of formation of oxygen-compounds of, **25**, 593.
 - loss of, by drainage, **24**, 284.
- Nitrogen** of manure, accumulation of, in the soil, **24**, 284.
- Nitrogen**, Maxwell Simpson's method for the determination of, in organic and inorganic compounds, **6**, 289.
- modification of the apparatus of Varrentrapp and Will for the estimation of, **11**, 347.
 - as nitrites and nitrates in drainage waters, **24**, 291, 295.
 - a series of organic acids containing, **11**, 79.
 - in organic bodies, modification of Dumas' method for the estimation of, **25**, 526.
 - organic compounds in which hydrogen is replaced by, **18**, 268, 298; **19**, 57; **20**, 36.
 - pentatomic conjugated compounds of, **24**, 483.
 - percentage of, in the dry matter of wheat-grain at Rothamsted, **10**, 10.
 - percentage of, in mill-products of wheat-grain, **10**, 30.
 - percentage of, in the products of wheat-grain from the colonial steel hand-mill, **10**, 37.
 - as plant food, **25**, 1112.
 - probable existence of, combined with silicon, in soils and other substances, **1**, 45.
 - quantity of, in muscular tissue, **25**, 512.
 - relation of sewage to Peruvian guano, in amount of, reckoned as ammonia, **19**, 103.
 - saline manures containing, **1**, 152.
 - in steel, **17**, 390; **21**, 282.
 - supplied to the soil as manure, and not recovered in the crop, **24**, 577.
 - table for the reduction of cubic centimeters of, to grams, **21**, 118.
- Nitrogen** of vegetation, sources of, **16**, 100.

- Nitrogen chloride, constitution of, **7**, 51.
 ——— explosion of, **23**, 45.
 Nitrogen chlorophosphuret, **3**, 135, 353.
 ——— analysis of, **17**, 230.
 ——— crystalline form of, **17**, 227.
 ——— and its products of decomposition, **17**, 225.
 Nitrogen-compounds, classification of, **27**, 982.
 ——— determination of, **1**, 281.
 ——— heat evolved in the formation of, **24**, 615.
 ——— organic, ammonia evolved by alkaline permanganate, acting on, **21**, 161.
 ——— organic, estimation of, in potable waters, **21**, 87.
 Nitrogen dioxide, action of zinc-ethyl on, **11**, 80.
 ——— action of zinc-methyl on, **11**, 88.
 ——— See also Nitrous Oxide.
 Nitrogen iodide, constitution of, **4**, 31; **6**, 90; **7**, 51.
 ——— explosion of, **23**, 45.
 Nitrogen oxides, heat evolved in the formation of, **24**, 1002.
 ——— reduction of, by metallic copper in organic analysis, **19**, 359.
 Nitrogen peroxide. See Nitrogen Tetroxide.
 Nitrogen phosphide, **2**, 129.
 Nitrogen protoxide, photographic electric spectra of metals in, **17**, 86.
 ——— See also Nitrous Oxide.
 Nitrogen protoxide and dioxide, action of the electric discharge on, **13**, 361.
 Nitrogen tetroxide, absorption-spectrum of, **24**, 184; **25**, 280.
 ——— heat-phenomena accompanying the transformation of, into nitric acid, and its introduction into organic compounds, **24**, 871, 872.
 ——— synthesis of, **25**, 1072.
 ——— vapour-density of, **15**, 156.
 ——— See also Hyponitric Acid.
 Nitrogen and oxygen, diffusion of, into a vacuum, **17**, 351.
 Nitrogen and oxygen, passage of, through heated platinum, **20**, 261.
 Nitrogen and phosphorus, compounds containing, **2**, 121.
 Nitrogen, phosphorus, arsenic, and antimony bases compared, **11**, 76.
 Nitrogenous compounds from milk-sugar, **25**, 71.
 Nitrogenous compounds, possible influence of ozone in promoting the formation of, from free nitrogen within or in connection with the plant or the soil, **16**, 144.
 Nitrogenous matter in the atmosphere, detection of, **25**, 1010.
 Nitrogenous organic matter in waters, determination of, **20**, 415.
 Nitrogenous principles of vegetables considered as the sources of artificial alkaloids, **3**, 309.
 Nitro-glycerin, explosion of, **23**, 46; **24**, 347, 367.
 ——— heat evolved in the formation of, **24**, 872.
 ——— method of determining the gases resulting from the explosion of, **24**, 1219.
 ——— products of its decomposition by potash, **7**, 222.
 ——— toxicology of, **24**, 1078.
 Nitroglycerin and various dynamites, **24**, 769.
 Nitro-glycol, **24**, 1036.
 Nitro-hydrocinnamic acid, **25**, 300.
 Nitronammite, heat evolved in the formation of, **24**, 872.
 Nitromesidine, **2**, 116—124.
 Nitronesitylene - sulphuric acid, **25**, 1019.
 Nitrometaiodotoluene, **24**, 682.
 Nitrometastyril, **11**, 351.
 Nitromethane, **25**, 804, 997.
 Nitromethyl-benzophenone, **25**, 1004.
 Nitromethyl-noropianic acid, **21**, 360.
 Nitronaphthalene, action of hydrogen bromide on, **25**, 136.
 ——— action of phosphorus pentachloride on, **25**, 301.
 ——— heat of combustion of, **24**, 871.
 Nitronaphthalenes, **24**, 695; **25**, 699.
 Nitro-orthoacetoluide, **25**, 563.
 Nitro-orthotoluidine, **24**, 563.
 Nitro - β - parabromotoluene - sulphonic acid, **24**, 1055.
 Nitrophenitidine, **3**, 79.
 Nitrophenol, **10**, 203.
 Nitrophenol, alkaline salts of, **10**, 206.
 Nitrophenolsulphonic acids, formation of substituted, **25**, 869.
 β -Nitrophenylchlorolactic acid, **25**, 300.
 Nitrophenylene-diamine, **14**, 242.
 Nitrophenylene-diamine, action of nitrous acid on, **13**, 51.
 Nitrophosphate of phenyl, **7**, 242.
 Nitrophthalic acid, **8**, 304; **25**, 75.
 Nitrophenyl, **9**, 274.
 Nitropopulic acid, **4**, 214.
 Nitroprussides, **19**, 341.
 Nitropyrene, **24**, 690.
 Nitroresorcin, **24**, 831.
 Nitrosodiethylin, **25**, 233.
 Nitrosogens, **17**, 162.
 Nitrosomphthalin, application of, to dyeing and printing, **14**, 253.
 ——— formation, composition, and properties of, **9**, 6, 7; **14**, 247.

- Nitrosophenylene, **9**, **2**, **4**; **14**, 212.
 Nitrostyrol, preparation of, **11**, 339.
 Nitrosulphates, decomposition of, **III**, 362.
 Nitrosulphomesitylenic acid, **24**, 376.
 Nitrothelme, **1**, 239.
 Nitrotoluene, heat of combustion of, **24**, 871.
 Nitrotoluic acid, **III**, 431.
 Nitrotoluic acid, action of sulphuric and nitric acids on, **III**, 437.
 Nitrotoluic acid, formation of, **III**, 421.
 Nitro-*a*-toluic acid, **25**, 709.
 Nitrotoluidine, **3**, 184.
 Nitrotolylene dichloride, **25**, 817.
 Nitro-uramidobenzoic acid, **25**, 497.
 Nitrous acid, action of, on amido-compounds, **20**, 36.
 ——— action of, on benzidine, **20**, 92.
 ——— action of, on diamido-compounds, **20**, 91.
 ——— action of, on diazo-amidobenzoic acid, **18**, 309.
 ——— action of, on morphine, **24**, 264.
 ——— action of, on naphthylamine, **19**, 135.
 ——— action of, on nitrophenylenediamine, **13**, 51.
 ——— action of, on the so-called sulphur-ureas, **24**, 267.
 ——— action of, on tyrosine, **22**, 290.
 ——— action of, on urea, in aqueous solution, **24**, 265.
 ——— basicity of, **24**, 200.
 ——— behaviour of aniline and the alcohol-bases with, **3**, 231.
 ——— estimation of, in nitrous sulphuric acid, **25**, 173.
 ——— existence and action of, in the soil, **24**, 852.
 ——— recovery of, in the manufacture of sulphuric acid, **24**, 1100.
 ——— transformation of, in soil, **25**, 319.
 ——— in the water of irrigation canals, **24**, 950.
 Nitrous and nitric acid in rain-water, **25**, 87.
 Nitrous and nitric acid, alternate predominance of, in rain-water, **25**, 281.
 Nitrous ether, absorption of its vapour by charcoal, **20**, 164.
 ——— action of, on benzamide, **25**, 303.
 Nitrous and nitric ethers, their decompositions and reactions, **20**, 576.
 Nitrous oxide and other gases, automatic thermo-regulator for use in the preparation of, **24**, 639.
 Nitrous oxide, salts of, **21**, 184.
 Nitrous substitution, bases produced by, **12**, 152.
 Nitroxamylene, nitroxysulphide of, **14**, 139.
 Nitroxin, action of, upon amylene, **13**, 130.
 Nitroxinaphthalin, **13**, 132.
 Noctilucin, **25**, 1102.
 Nolla slates in Graubünden, **25**, 991.
 Nomenclature of salts, on some points in the, **23**, 22.
 Nomenclature and notation, chemical, **17**, 421.
 Nomenclature and notation (Wanklyn's) for expressing the different states of condensation of a given element, **14**, 16.
 Non-luminous discharge, effect of, **25**, 663.
 Nontronite, **23**, 29.
 Nonylic acid from the octyl alcohol of Heracleum oil, **25**, 300.
 Nonyl-methyl ketone, **24**, 387.
 Norhemipinic acid, **21**, 362.
 Noria (?) crystallised from borax, **24**, 804.
 Normal amyl alcohol and ethers, **24**, 1033.
 Normal butyl alcohol, conversion of, into butylene hydrate, **25**, 474.
 Normal butyl alcohol, conversion of, into isobutyl alcohol, **25**, 474.
 Normal caproic acid, **24**, 1034.
 Normal lactic acid, **22**, 62.
 Normal olefine-lactic acids, **22**, 65.
 Normal propyl alcohol, synthesis of, **25**, 234.
 Normal propyl alcohol, conversion of, into isopropyl alcohol, **25**, 236.
 Normal propyl alcohol, synthesis of, from ethyl alcohol, **24**, 1030.
 Normal propyl compounds, pure, **25**, 235.
 Normal propyl ethers, **24**, 1032.
 Normal propyl iodide, boiling point and specific gravity of, **25**, 231.
 Normal valeric acid, **24**, 1043.
 Noropianic acid, **21**, 362.
 Notation of organic and inorganic compounds (Frankland's), **19**, 372.
 Nuclear structures in the yolk of the hen's egg, **24**, 746.
 Nuclei of blood-corpuscles, chemical relations of, in birds and snakes, **24**, 740.
 Nuclei, effect of, in facilitating the separation of gases and solids from solutions, **22**, 136, 144.
 Nuclei of pus-corpuscles, **24**, 743.*
 Nuclein, **24**, 743.
 Nutmeg, oil of, **17**, 11.

- Nutmeg-oil, myristicene obtained from, **25**, 3.
 Nutritive and assimilative processes in fungi, **24**, 1205.
 Nutritive value of mangolds, **25**, 913.
 Nutritive value of meadow-grass, **25**, 914.

O.

- Oak-bark, estimation of tannin in, **24**, 594.
 Oak-bark, examination of, **1**, 139.
 Oak-extract, preparation of, for analysis, **24**, 599.
 Oak-manna, **25**, 813.
 Oat-straw, proportion of fat and wax in, **24**, 1193.
 Ochreous deposits from the mineral springs of the Teplitz basin, **24**, 1171.
 Octacetylated milk-sugar, **25**, 70.
 Octane, **25**, 1086.
 Octyl alcohol of *Heracleum* oil, nonylic acid from, **25**, 300.
 Octyl hydride from cannel coal, **15**, 425.
 Odour of waters, mode of observing, **18**, 118.
 Oenanthic acid and oenanthic ether, **5**, 279.
 Oenanthol, **9**, 189.
 Oenanthyl iodide from Boghead naphtha, **15**, 361.
 Oenanthylamine, platinum salt of, **15**, 361.
 Oenanthylates, metallic, **1**, 3.
 Oenanthylic acid, **3**, 210.
 ——— decomposition of, under the influence of the galvanic current, **3**, 224.
 ——— formation and analysis of, **1**, 2.
 ——— formation of, by oxidation of oleic acid, **III**, 240.
 Oenanthylic and caprylic alcohols, **18**, 290.
 Oenanthylic ether, **1**, 2.
 Oenanthylidene-dibenzo-diamide, **24**, 151.
 Oenanthylidene-dimonobromo-dinitro-benzodiamide, **24**, 151.
 Oil, apparatus for the extraction of, from seeds, **24**, 868.
 Oil of *Bassia latifolia*, some new acids contained in, **2**, 231.
 ——— properties of, **2**, 232.
 Oil of cajuput, constitution of, **14**, 63.
 Oil, castor, fatty acids of, **1**, 80.
 Oil of chamomile, blue, **24**, 258.
 Oil of cinnamon, artificial production of, **7**, 280.
 Oil of cocoa-nut, solid volatile fatty acids of, **1**, 404.
 Oil of East Indian grass, **II**, 122.
 Oil of geranium, Indian, **24**, 261.
 Oil of grape-seed, **24**, 703.
 Oil of laurel turpentine, hydrate of, **II**, 121.
 Oil of lemons, **4**, 138.
 Oil of orange-peel, oxidation-products of, **24**, 1186.
 Oil of *Ptychotis Ajwan*, **8**, 289.
 Oil-bean, Chinese, **25**, 1032.
 Oil-bearing limestone of Chicago, **24**, 674.
 Oil-seeds, valuation of, **24**, 761, 960.
 Oils, influence of, in retarding the action of acids upon metals, **25**, 116.
 ——— peculiar property of ether and some essential, **4**, 133.
 ——— reaction of, with sulphurous acid, **24**, 452.
 ——— expressed from the seeds of the white and the black mustard, **2**, 96.
 Oils of anise and fennel, action of iodine on the, **1**, 404.
 Oils, drying, properties of, **25**, 183.
 Oils, essential, **25**, 1.
 ——— compounds of, with alkaline bisulphites, **5**, 317.
 ——— detection of spirit in, **25**, 265.
 ——— examination of, **24**, 1099.
 ——— hydrocarbons obtained from, **17**, 17.
 ——— containing oxygen, **25**, 7.
 ——— physical properties of crude, **27**, 2.
 ——— possessing no rotatory energy, **II**, 45.
 ——— refractive indices and specific gravities of, **17**, 3.
 ——— researches on, **17**, 1—21.
 Oils, fixed, examination of, **25**, 1047.
 Oils, volatile, obtained in the distillation of wood, **3**, 183.
 Oils and fats, preliminary notice on the action of sugar on, **7**, 200.
 Oleaginous seeds, germination of, **24**, 1207.
 Olfiant gas, diffusion-velocity of, **16**, 400.
 ——— formation of alcohol from, **8**, 148.
 ——— igniting point of, **16**, 399.
 ——— See also Ethylene.
 Olefine-lactic acids, normal, **22**, 65.
 Olefine-lactic acids, secondary, **22**, 67.
 Olefines, **25**, 430.
 ——— derivatives from, **12**, 109; **13**, 35, 129; **14**, 128.

- Olefines, production of, from paraffin, by distillation under pressure, **24**, 342.
 — refraction-equivalents of, **23**, 151.
 Oleic acid, compounds of glycerin with, **6**, 284.
 Olein, **6**, 284.
 Olein in human fat, **5**, 85.
 Olibanum, **24**, 695.
 Oligoclase from Vesuvius, **25**, 51.
 Olive-oil, action of sun-light on, **24**, 1192.
 Olive-oil, detection and estimation of earthnut-oil in, **25**, 180.
 Onion, analysis of, **2**, 13.
 Oolite and lias, presence of manganese in, **18**, 206.
 Oolitic iron-ore, Wiltshire, occurrence of vanadium in pig-iron smelted from, **17**, 21.
 Oolitic iron-ores, analysis of, **15**, 335.
 Opal, atomic volume and specific gravity of, **11**, 96.
 Opal from Waddela Plains, Abyssinia, **24**, 2.
 Opaque media, colour of, **25**, 30.
 Operations, chemical, calculus of, **21**, 367.
 Opianic acid, **11**, 172; **5**, 265; **15**, 453.
 — action of hydriodic acid on, **16**, 347.
 — action of hydrochloric acid on, **16**, 346.
 — action of hydrochloric and hydriodic acids on, **21**, 358.
 — action of nascent hydrogen on, **16**, 349.
 — action of potash on, **16**, 347.
 — action of sulphuric acid on, **24**, 378.
 — decompositions and derivatives of, **16**, 346.
 — normal, **16**, 361.
 — reduction of, to meconin by the action of sodium-amalgam, **21**, 359.
 — resolution of, into meconin and hemipinic acid, **16**, 348.
 Opianic ether, **5**, 265.
 Opianine, **15**, 455.
 Opianyl, **5**, 263; **15**, 454.
 — action of bromine upon, **9**, 276.
 — action of chlorine upon, **9**, 275.
 — action of iodine chloride upon, **9**, 276.
 — action of nitric acid upon, **9**, 274.
 — action of sulphuric acid and peroxide of lead upon, **9**, 276.
 — identity of, with meconin, **9**, 274.
 Opium, chemistry of, **15**, 446.
 Opium, constituents of, **9**, 273.
 — crystalline constituents of, **5**, 257.
 — estimation of morphine in, **25**, 180, 181.
 — microscopical characters of its various preparations, **18**, 38.
 — new organic base in, **1**, 108.
 Opium alkaloids, **24**, 232, 1064; **25**, 150.
 — are they products or educts? **15**, 455.
 — coloration of, by sulphuric acid, **25**, 724.
 — contributions to the history of, **25**, 72, 504.
 — physiological action of, **25**, 1107.
 Opium extract, **25**, 1129.
 Optical properties of bodies, application of, to the detection and discrimination of organic substances, **17**, 304.
 Optical rotatory power of gastric juice, **14**, 256.
 Optical rotatory powers of organic bodies, relations between, **25**, 665.
 Optical rotatory power of peppermint-camphor, **15**, 26.
 Optical test for didymium, **10**, 219.
 Orange-peel, oil of, **17**, 12.
 Orange-peel, oxidation-products of essential oil of, **24**, 1186.
 Orange-tree, analysis of the ashes of the, **11**, 370.
 Orange-tree, analysis of the ashes of a diseased, **21**, 515.
 Orange-trees, analysis of the ashes of healthy, **21**, 523.
 Orchella weed, note on some varieties of, and products obtained from them, **20**, 221.
 Orein, action of chloride of sulphur on, **20**, 223.
 — action of iodine chloride on, **17**, 327.
 — synthesis of, **25**, 621, 1096.
 Orein and erythrin, preparation of, **20**, 222.
 Oreins, chlorine and bromine-substitution-products of the, **25**, 297.
 Oreins, nitro-substitution-compounds of, **24**, 357.
 Ore, brown iron, **11**, 321.
 Ore, brown iron, composition and quantitative analysis of, **11**, 322.
 Ore, cobalt, analysis of, found in western India, **11**, 39.
 Ores, cinnabar, table of composition of, **4**, 185.
 Ores of iron, oolitic, analysis of, **13**, 335.
 Ores of iron, titanium in, **15**, 339.
 Organic acids, law of basicity of, **22**, 62.

- Organic acids, series of, containing nitrogen, **11**, 79.
- — peroxides of the radicals of, **17**, 266.
- — synthesis of, **25**, 142.
- — can they contain more water-residues (HO) than carbon-atoms? **25**, 965.
- Organic acids, anhydrous, researches on the, **5**, 127; **11**, 226.
- Organic acids, $(\text{CH})_n\text{O}_4$, boiling below 300°C ., **11**, 235.
- Organic analysis, combustion blow-pipe for, **17**, 49.
- — use of gas as fuel in, **11**, 30.
- — Magnus's apparatus for, **7**, 250.
- — notes on, **24**, 957.
- — reduction of the oxides of nitrogen by metallic copper in, **19**, 359.
- Organic base in opium, **1**, 408.
- Organic bases containing antimony, **5**, 66.
- Organic bases, their formation by the decomposition of nitrogenous substances, **11**, 293.
- — their formation by the reduction of nitro-compounds, **11**, 290.
- — their formation by the direct substitution of organic radicals for the hydrogen in ammonia, **11**, 278—287.
- — periodides of, **18**, 99; **19**, 145.
- — researches on the combinations of several, with hydrosulphocyanic, hydroferrocyanic, and hydroferri-cyanic acids, **1**, 405.
- Organic bases, volatile, researches on the, **1**, 269, 285; **2**, 36, 300; **3**, 231; **4**, 304.
- — volatile, molecular constitution of the, **3**, 276.
- Organic carbon and nitrogen, estimation of, in potable waters, **21**, 87.
- Organic chemistry, Strecker's researches in, **7**, 271.
- Organic colloïd substances, dialysis of, **15**, 256.
- Organic compounds, absorption-spectra yielded by certain, **22**, 324.
- — action of oxidizing agents on, in presence of excess of alkali, **21**, 161.
- — apparatus for estimating the melting points of, **24**, 873.
- — boiling points of, **24**, 483.
- — changes which they suffer on their passage into the urine, **1**, 421.
- — detection of chlorine, bromine, and iodine in, **25**, 1039.
- Organic compounds, detection and discrimination of, by their optical properties, **17**, 301.
- — electrolysis of, **2**, 157.
- — method of effecting the substitution of chlorine for hydrogen in, **15**, 41.
- — synthesis of, **17**, 37.
- — construction of tables exhibiting the composition and mutual relations of, **15**, 36.
- — relations between the optical rotatory powers of, **25**, 665.
- Organic compounds, containing boron, **15**, 363.
- — containing metals, **6**, 57.
- — containing metals and phosphorus, **2**, 297.
- Organic compounds of thallium, **17**, 148.
- Organic compounds of high boiling point, vapour-densities of, **25**, 295.
- Organic and inorganic compounds, contributions to the notation of, **19**, 372.
- Organic and inorganic compounds, specific heat of, **19**, 202, 228.
- Organic derivatives of sulphuric acid, **24**, 552.
- Organic liquids, observations on the atomic volumes and boiling points of analogous, **1**, 363.
- Organic liquids, tests for some, **25**, 645.
- Organic matter in the air, detection of, **23**, 98; **25**, 1040.
- — in building-rubbish, **25**, 271.
- — estimation of, in iron ores, **15**, 338.
- — estimation of, by means of manganate and permanganate of potassium, **11**, 217.
- — estimation of, in waters by incineration, **18**, 119.
- — estimation of, in water by potassium permanganate, **18**, 120.
- — estimation of, in drinking waters, **24**, 754.
- — estimation of the amount of, in drinking waters by means of a standard solution of potassium permanganate, **16**, 62.
- — influence of ozonous air on, **16**, 153.
- — nitrogenous, determination of, in waters, **20**, 445.
- — in Thames water, **4**, 387.
- — in water, **23**, 371.
- Organic matters, application of electrolysis to the detection of poisonous metals in mixtures containing, **13**, 12.

- Organic peroxides theoretically considered, **17**, 281.
- Organic products, quantitative estimation of, by circular polarisation, **13**, 266.
- Organic radicals, isolation of, **2**, 263.
- — Part II, amyl, **3**, 30.
- — Part III, action of solar light on ethyl iodide, **3**, 322.
- — chemical constitution and nature of, **3**, 369; **4**, 41.
- Organic sulphur-compounds, **17**, 105.
- Organic and other volatile matters, estimation of, in potable waters, **24**, 79.
- Organism, distribution of hæmoglobin in the living, **25**, 258.
- Organo-compounds of antimony, formation of, **13**, 186, 189.
- Organo-compounds of antimony, properties of, **13**, 213.
- Organo-compounds of arsenic, formation of, **13**, 185, 190.
- — properties of, **13**, 213.
- Organo-compounds of bismuth, formation of, **13**, 187.
- — properties of, **13**, 204.
- Organo-compounds of cadmium, formation of, **13**, 180.
- — properties of, **13**, 199.
- Organo-compounds of lead, formation of, **13**, 187, 189.
- — properties of, **13**, 205.
- Organo-compounds of magnesium, formation of, **13**, 180.
- — properties of, **13**, 193.
- Organo-compounds of mercury, formation of, **13**, 183, 188.
- — properties of, **13**, 207.
- Organo-compounds of tellurium, formation of, **13**, 187.
- — properties of, **13**, 225.
- Organo-compounds of tin, formation of, **13**, 181.
- — properties of, **13**, 199.
- Organo-compounds of zinc, formation of, **13**, 178.
- — properties of, **13**, 194.
- Organo-metalamides, **12**, 89.
- Organo-metallic bodies, constitution and theoretical importance of, **13**, 227.
- — different stages of stability of, **13**, 229.
- — formation of, by the action of the respective metals alloyed with potassium or sodium upon the iodides of the alcohol-radicals, **13**, 185.
- — formation of, by the action of the zinc-compounds of the organic radicals upon the haloïd compounds either of the metals themselves, or their organo-derivatives, **13**, 187.
- Organo-metallic bodies, formation of, by the displacement of a metal in an organo-metallic compound by another and more positive metal, **13**, 190.
- — formation of, by union of the organic radical in *stata nascenti* with the metal, **13**, 178.
- — a method of forming, **19**, 128.
- — properties of, **13**, 191.
- — researches on, **13**, 177.
- Organo-metallic radicals, formation of, **16**, 17.
- Organo-thionic acids, new series of, **10**, 55, 213.
- Original gravities, **5**, 229.
- Orsellinate of ethyl, **20**, 224.
- Orsellinate of methyl, **20**, 325.
- Orthobromobenzoic acid, action of phosphorus pentachloride on, **24**, 1055.
- Orthobromobenzoic acid, conditions under which it is formed, **24**, 365.
- Orthobromotoluene, **25**, 696.
- Orthobromotoluene-metasulphonic acid, **24**, 130.
- Orthobromotoluene, sulpho-acids obtained from, **24**, 129.
- Orthocarbonate of ammonium, as to the existence of a normal, **23**, 213.
- Orthocarbonate of ethyl, **17**, 198.
- Orthocarbonate of ethyl, formation of guanidine from, **19**, 254.
- Orthoclase, **24**, 113.
- Orthoclase from Harzburg, **25**, 53.
- Orthoclases, chemical composition of, **25**, 289.
- Ortho-iodotoluene, **24**, 683.
- Ortho-metatoluidine, **24**, 682.
- Orthomonebromo-sulphobenzoic acid, **24**, 369.
- Orthonitrochlorophenol, preparation of, **25**, 14.
- Orthonitrodichlorophenol, decomposition of, by heat, **24**, 1121.
- Orthonitro-metacetylhydride, **24**, 682.
- Orthonitrophenol, chlorination of, **25**, 14.
- Ortho-parabromotoluene, **24**, 682.
- Ortho-para-iodotoluene, **24**, 682.
- Orthophosphoric sulphobromide, **25**, 986.
- Orthosilicate of ethyl, action of ammonia on, **19**, 255.
- Orthotoluic acid, formation of, by a new method, **25**, 491.
- Orthotoluidine, derivatives of, **24**, 683, 1061.
- Orthovanadate and chloride of lead, **24**, 34.
- Orthovanadates, reaction of, **24**, 31.
- Orthoxylene from liquid bromotoluene, **25**, 893.

- Osmium, elementary allotropism of, **III**, 97.
- Osmium, specific gravity and atomic volume of, **III**, 63.
- Osmium-iridium, absorption of hydrogen by, **20**, 279.
- Osmose, **15**, 268.
- Osmose, influence of pressure on, **25**, 974.
- Osmotic force, **8**, 43.
- Ossein, action of hydrochloric acid on, **24**, 733.
- determination of, in fossil bones, **24**, 733.
- Othyl sulphide, **7**, 189.
- thiacetate, **7**, 189.
- Othyl-urea, **8**, 159.
- Ox bile, analysis of putrid, **14**, 126.
- Ox gallstones, analysis of, **14**, 123.
- — composition of, **16**, 41.
- — hydrochloric acid extract of, **16**, 36.
- Oxalids, effect of, in developing fluorescence in a quinine solution, **22**, 176.
- Oxalate of allyl, **10**, 321.
- of barium, acid, **5**, 223.
- of biamidobenzoic acid, **9**, 272.
- (bi-) of menaphthalamine, **9**, 11.
- of chromium and potassium, **1**, 89.
- of chromium and potassium, red, **1**, 93.
- of codeine, **4**, 114.
- of didymium, **6**, 272.
- of ethyl: absorption of its vapour by charcoal, **21**, 188.
- — action of dry potassium ethylate on, **22**, 445.
- — action of sodium-amalgam on, **24**, 820, 908.
- — action of sodium-amalgam on an alcoholic solution of, **25**, 365.
- — action of sodium ethylate on, **22**, 442.
- — action of sodium and potassium on, **22**, 441.
- — action of zinc-ethyl on, **22**, 29.
- Oxalate of ethylene-hexethyl-diphosphonium, **14**, 100.
- Oxalate of hydrogen, reaction of, with hydrogen permanganate, **20**, 462.
- Oxalate of lead, calcination of, **24**, 1157.
- Oxalate of methyl and iodide of ethyl, action of zinc upon a mixture of, **22**, 10.
- Oxalate of methyl and iodide of methyl, action of zinc upon a mixture of, **22**, 38. §
- Oxalate of nitrocodeine, **4**, 116.
- of piperidine, **6**, 177.
- of silver, note on, **22**, 292.
- Oxalate of sparteine, **15**, 3.
- of strontium, acid, **5**, 224.
- of tellurethyl, **6**, 43.
- Oxalates of alkali-metals, solubility of, in water, **24**, 548.
- Oxalates of the earth-metals, acid, **5**, 223.
- Oxalates of thallium, **17**, 150.
- Oxalic acid, action of, on alkaline chlorides, **1**, 231.
- — action of potassium permanganate on, **25**, 608.
- — constitution of, **22**, 29.
- — formation of, from glyoxylic acid, **18**, 202.
- — metamorphoses of, **16**, 301.
- — osmose of, **8**, 58.
- — preparation of formic acid from, **9**, 183.
- — reaction of, with naphthol, **24**, 1042.
- — recovery of, from the residues of the "discharge" process, **24**, 172.
- — reduction of carbonic acid to, **21**, 121.
- Oxalic acid and colouring matter, recovery of, from the wash-waters of madder in garancin making, **24**, 768.
- Oxalic ether. See Oxalate of Ethyl.
- Oxaluric acid, synthesis of, **24**, 821.
- Oxamide, **16**, 94.
- Oxamide, dibenzyl-, **25**, 1026.
- Oxamline, **17**, 194.
- Oxanthracene, **15**, 48.
- Oxatyl (radical), **22**, 59.
- Oxethylenic bases, **15**, 405.
- Oxethylpiperidine, **24**, 1063.
- Oxethyl-triethylphosphonium, bromide, chloride, hydrate, perchlorate, and platinum-salt of, **14**, 84.
- — gold salt of, **14**, 85.
- — iodide, **14**, 83.
- Oxethyl-trimethylphosphonium, compounds of, **14**, 322.
- Oxidation of the acids of the lactic series, **20**, 296.
- Oxidation in the blood, influence of quinine on, **24**, 1202.
- Oxidation by means of charcoal, experiments on, **20**, 293.
- Oxidation effected by peroxide of hydrogen, **16**, 333.
- Oxidation and deoxidation effected by the alkaline peroxides, **16**, 316.
- Oxidation of ethylic and methylic benzoates, **20**, 131.
- Oxidation, gradual, relation between the products of, and the molecular constitution of the bodies oxidised **19**, 477.
- Oxidation of india-rubber, **18**, 44, 280.
- Oxidation, limited, by means of alkaline permanganate, **20**, 301.

- Oxidation, limited: determination of the oxygen consumed, **20**, 227.
 ——— quantitative analysis by, **20**, 173.
 Oxidation in the organism, **25**, 1030.
 Oxidation, relation between the products of, and the molecular constitution of the bodies oxidised, **20**, 30.
 Oxidation-products of bile-pigments and their absorption-bands, **25**, 307.
 Oxide of allylene, **25**, 143.
 ——— of arsenethylum, **7**, 266.
 ——— of arsentriethyl, **7**, 263.
 ——— of ethylene, its compounds with acids, **15**, 398.
 ——— its compounds with ammonia, **15**, 405.
 ——— considered as a link between organic and mineral chemistry, **15**, 387.
 ——— hydrates of, **15**, 394.
 ——— oxidation of, **15**, 393.
 Oxide of ethylene-sodium, hydrated, **22**, 200.
 Oxide, ferrous, volumetric estimation of, alone and in conjunction with ferric oxide, **8**, 234.
 Oxide of iron, absorption of ammonium-salts by, **21**, 11, 14.
 ——— absorption of potassium-salts by, **21**, 6, 13.
 ——— action of hydrogen on, **24**, 103.
 ——— method of separating, from raw sugar, **25**, 530.
 Oxide of iron and alumina, part taken by, in the absorptive action of soils, **21**, 1.
 Oxide, magnesian, class of double sulphates containing a, **11**, 49.
 Oxide manganese-manganic, **11**, 80.
 Oxide of mercury, action of bromine on dry, **15**, 483.
 ——— of methyl-plumbethyl, **7**, 269.
 ——— of phenyl, **7**, 242.
 ——— of silicon, hydrated, **11**, 93.
 ——— of silver, alkaline reaction of, **24**, 109.
 ——— of stannethylum, **6**, 59.
 ——— of stibtriamyl, **9**, 283.
 ——— of stibtriethyl, **9**, 279.
 ——— of tellurethyl, **5**, 72; **6**, 43.
 ——— of tetramylammonium, **4**, 324.
 ——— of tetrethylammonium, **4**, 327.
 ——— of tetrethylstibine, **13**, 119.
 ——— of triethylo-tolylammonium, **7**, 73.
 ——— of triethylphosphine, **13**, 293.
 ——— of triethylphosphine, compound of, with platonic chloride, **13**, 298.
 ——— of triethylphosphine, preparation and properties of, **24**, 629.
 Oxide of triethylphosphine not reduced by sodium, **13**, 303.
 ——— of triethylphosphine, compound of, with iodide of zinc, **13**, 296.
 Oxides, action of, on peroxide of hydrogen, **11**, 358.
 ——— behaviour of some, with caustic potash in presence of oxide of chromium, **6**, 54.
 ——— decomposition of, by chlorine, **11**, 234.
 ——— solubility of, in alkali, **25**, 672.
 ——— specific heat of, **19**, 198, 226.
 Oxides and carbonates, their behaviour with magnesium, **20**, 128.
 Oxides of carbon, their behaviour with magnesium, **20**, 129.
 ——— of cerium, **24**, 495.
 ——— of didymium, **6**, 262.
 ——— of manganese, contribution to the history of the, **19**, 294.
 Oxides, metallic, alleged influence of calcination on the heat of solution of, **25**, 207.
 ——— atomic volumes and specific gravities of, **11**, 86.
 ——— effect of various, in facilitating the decomposition of potassium chlorate by heat, **24**, 1155.
 ——— electric conductivity of, **24**, 302.
 ——— influence of the calcination of some, on the heat disengaged in their reactions, **24**, 869.
 ——— notice of further experiments on the reduction of, by peroxide of barium, **7**, 304.
 Oxides of nitrogen. See Nitrogen (p. 198).
 Oxides of thallium, **17**, 128.
 Oxidised surface, influence of, on the subsequent action of sulphuric acid of various strengths upon zinc, **19**, 435.
 Oxidising agents, action of, on nitrite of amyl, **19**, 336.
 Oxidising agents, action of, on sulphocyanates, **11**, 174.
 Oximido-dihydroxyl-anthraquinone, **24**, 534.
 Oxonic acid, **16**, 302.
 Oxyanido-nitride of tungsten, **3**, 174.
 Oxyanthraquinone, **25**, 141.
 Oxyanthraquinone-sulphonic acid, **25**, 141.
 Oxybenzoic acid, changes which it undergoes in the blood, **25**, 637.
 Oxybenzoic acid, iodised products of, **25**, 622.
 Oxybromides of tellurethyl, **6**, 41.
 Oxybromides of tungsten, **25**, 287.
 Oxyamphoric acid, **24**, 1050.
 Oxyamphoric anhydride, **24**, 549; **25**, 147, 896.

- Oxycannabin, **22**, 418.
- Oxychloroether from dichlorinated ether, **25**, 606.
- Oxychloride, chromic, chromate of, **24**, 1170.
- Oxychloride of chromium, **23**, 31.
- Oxychloride of copper, **8**, 213.
- (atacamite) action of heat on, **9**, 140.
- Oxychloride of magnesium, hydrated, **24**, 1168.
- of phosphorus, new, **24**, 1160.
- use of, as a reagent in organic chemistry, **5**, 226.
- Oxychloride of selenethyl, **7**, 95.
- of tellurethyl, **6**, 41.
- of triethylphosphine, **13**, 299.
- of zirconium, **24**, 1000.
- Oxychlorides of antimony, **25**, 122.
- of phosphorus, amidated, **22**, 16.
- of silicon, **24**, 1000.
- action of heat on, **25**, 221.
- of tungsten, **25**, 287.
- Oxychlorides and oxysulphates, hydrated cupric, from Cornwall, **18**, 77, 83.
- Oxygen, acidification of alcohols by, or by atmospheric air, **6**, 205.
- action of, on copper nitrate in a state of tension, **25**, 674.
- action of, on vegetable infusions, **25**, 640.
- active, effect of, on pyrogallie acid, **25**, 703.
- affinity of, for hydrogen, **25**, 215.
- amount of, in the air of towns, **11**, 228.
- application of, to the freeing of petroleum springs from paraffin, **25**, 186.
- Oxygen, atmospheric, action of, on isoprene, **15**, 115.
- Oxygen, atomic weight of, **19**, 16.
- causes of variation in the proportion of, in the arterial system, **25**, 253.
- combustion of carbon by, **25**, 383.
- Oxygen, compressed, combustion of iron in, **17**, 52.
- Oxygen, consumption of, within vegetable cells in the dark, **16**, 161.
- determination of the quantity of, necessary to oxidise the organic matter in potable waters, **21**, 81.
- dialytic separation of, from atmospheric air by means of other gases, and by means of a vacuum, **20**, 213.
- diffusion of, in the organism, **25**, 1030.
- electric spectra of metals in, **17**, 87.
- Oxygen, electrification of, for the production of ozone, **24**, 994.
- Oxygen, electrified, **5**, 274.
- Oxygen, extraction of, from atmospheric air, **5**, 269.
- Oxygen of hæmoglobin, influence of acids on the, **25**, 312.
- Oxygen, heat produced by the combination of metals with, **6**, 247.
- influence of light and heat on the evolution of, by water-plants, **24**, 1080.
- intimate action of substances which assist the evolution of, from potassium chlorate, **24**, 1151.
- liberation of, within the growing cells and intercellular passages of plants in sunshine, **16**, 150.
- Mallet's process for the preparation of, **24**, 859.
- method of determining the proportion of, in atmospheric air, **4**, 221.
- oxidizing power of, when disengaged by means of voltaic electricity, **11**, 285.
- rapid eudiometric absorption of, by means of an ammoniacal solution of ammonio-cuprous sulphite, **11**, 46.
- refraction-equivalents of, **23**, 112.
- Oxygen in the nascent state, researches on, **8**, 237.
- Oxygen, positive and negative, Schönbein's theory of, **16**, 333.
- Oxygen, symbol of, in Brodie's chemical calculus, **21**, 407.
- Oxygen-acids, argument of the binary theory of salts derived from the non-action of the anhydrous, on organic colours, **1**, 332.
- Oxygen-compounds of nitrogen, heat of formation of, **25**, 593.
- Oxygen-ethyl or ethyl, **4**, 238.
- Oxygen-gas: statement that the whole of a volume of dry oxygen gas can be converted into ozone by the passage of electric sparks, erroneous, **13**, 359.
- Oxygen-radicals, researches on, **6**, 182.
- Oxygen and other gases, action of the electric discharge on, **13**, 344.
- Oxygen and hydrogen, diffusion of, into a vacuum, **17**, 350.
- Oxygen and nitrogen, diffusion of, into a vacuum, **17**, 351.
- Oxygen and nitrogen, passage of, through heated platinum, **20**, 261.
- Oxygen and water, atomic weights of, **11**, 107.
- Oxygenated water, action of potassium permanganate on, under the influence of a freezing mixture, **25**, 921.
- Oxyhydrogen light, **24**, 972.
- Oxyiodide of tellurethyl, **6**, 42.

Oxylepidene, **25**, 295.
 Oxylepidin, **24**, 537.
 Oxylizic acid, **5**, 62; **12**, 208.
 Oxypieric acid, **24**, 227.
 — a new derivative of, **25**, 894.
 Oxypieric or styphnic ether, **19**, 236.
 Oxysalic acid, **16**, 353.
 Oxsulphide of carbon, **25**, 995.
 Oxythymoquinone, **24**, 352.
 Ozone, **11**, 395; **5**, 272, 274; **20**, 1.
 — absorption of, by water, **25**, 785.
 — action of, on isoprene, **15**, 115.
 — action of, on vulcanised caoutchouc, **25**, 1072.
 — in the air of Manchester and other localities, **11**, 209.
 — atmospheric, **25**, 976.
 — average amount of, in different places, **20**, 6.
 — chemical and voltaic, destruction of, by various substances, **111**, 105.
 — comparative action of, on sulphate of indigo and on arsenious acid, **25**, 977.
 — composition and properties of, **9**, 168.
 — not condensed at common pressures by the cold produced by a mixture of solid carbonic acid and ether, **13**, 360.
 — decolorising effect of, upon sugar, **22**, 124.
 — dependence of amount of, on the direction of the wind, **20**, 3.
 — disengagement of, in the decomposition of potassium permanganate by sulphuric acid, **20**, 9.
 — disengagement of, in the electrolysis of water and of aqueous carbonic acid, **20**, 9.
 — disengagement of, by the green parts of plants, **20**, 11.
 — estimation of, **25**, 921.
 — not given out by flowers, **20**, 24.
 — formation of, in combustion and in the vital processes, **25**, 35.
 — formation of, by plants, **25**, 515.
 — formation of, in rapid combustion, **24**, 483.
 — new oxide of hydrogen and its relation to, **6**, 169.
 — possible influence of, in promoting the formation of nitrogenous compounds from free nitrogen, within, or in connection with, the plant, or in the soil, **16**, 144.
 — preparation of, in a concentrated state, **25**, 220.
 — preparation of, by a new method of producing a silent discharge of electricity, **25**, 879.

Ozone, production of, by electrification of air and oxygen, **24**, 994.
 — proportion of, in the air of the country, and its origin, **25**, 165.
 — protosulphate of manganese as a test of, **20**, 1.
 — relation of, to hyponitric acid, **111**, 2.
 — simple apparatus for the production of, with electricity of high tension, **25**, 1071.
 — starch-paper soaked in solution of potassium-iodide, as a test for, **20**, 1.
 — use of, as a purifier of the air, **20**, 26.
 — volumetric estimation of, **8**, 232.
 — volumetric relations of, **13**, 344.
 Ozone reactions of the air in the neighbourhood of graduation-houses for salt evaporation, **25**, 384.
 Ozone and peroxide of hydrogen, occurrence of, in the electrolysis of sulphuric acid, **7**, 251.
 Ozonous air, influence of, on organic matter, **16**, 153.

P.

Painting ground for stereochromic pictures, **24**, 1222.
 Paintings, action of light on sulphide of lead, and its bearing on the preservation of, in picture galleries, **18**, 215.
 Pale ales, alleged adulteration of, with strychnine, **5**, 173.
 Palladiochloride of dipyrindine, **22**, 412.
 — of ethylene-hexethyl-diphosphonium, **14**, 101.
 Palladium, absorption of gases by, **20**, 273.
 — its extraction, alloys, &c., **1**, 161.
 — place of, in the electrical series, **24**, 318.
 — relation of hydrogen to, **22**, 419.
 — specific gravity and atomic volume of, **111**, 62.
 Palladium alloy, 5 parts palladium with 4 parts silver, absorption of gases by, **20**, 276.
 Palladium alloys, occlusion of hydrogen by, **22**, 425.
 Palladium dichloride, compound of, with hydrochloride of strychnine, **2**, 257.
 Palladium disulphide, **24**, 213.
 Palladium subsulphide, **24**, 315.
 Palladium wire, retraction of, when charged with hydrogen and subsequently discharged, **22**, 421.
 Palladium, antimony and bismuth,

- thermo-electro joints formed with, **8**, 36.
- Palladium and lead, alloys of, **24**, 1166.
- Palmitic acid, **III**, 222.
- Palmitin, **III**, 226.
- Palmitate of barium, **8**, 8.
- of copper, **8**, 10.
- of ethyl, **8**, 11.
- of lead, **8**, 9.
- of lipyl, **8**, 7.
- of magnesium, **8**, 9.
- of silver, **8**, 10.
- of sodium, **8**, 8.
- Palmitic acid, compounds of glycerin with, **6**, 284.
- — in the fat of *Stillingia sebifera*, **8**, 5.
- Palmitic ether, **8**, 11.
- Palmitin, **8**, 7, 11.
- action of sodium amylate on, **5**, 315.
- Palmitus, **6**, 284.
- Palm-oil, analysis of, **24**, 762.
- Paludina*, hæmoglobin in the pharynx of, **25**, 255.
- Pancreatic ferment, **25**, 9.
- Pancreatic juice: its power of emulsifying neutral fats and fatty acids, **15**, 416.
- Papaveracea*, alkaloids of the, **25**, 1028.
- Papaverine, **8**, 282; **15**, 452; **24**, 1065; **25**, 724.
- action of zinc chloride on, **24**, 265.
- microscopical characters of, **18**, 37.
- oxidation of, **21**, 164.
- Paper, dendritic spots on, **25**, 646.
- improvement in the manufacture of, **25**, 1048.
- Paper-labels on bottles, glue for, **24**, 971.
- Paper-labels on glasses, preservation of, **25**, 272.
- Para-æsculetin, constitution of, **24**, 960.
- Para-azobenzoic acid, azophenylene from, **25**, 896.
- Parabanic acid, **25**, 423.
- — synthesis of, **25**, 1099.
- Para-bromo-metanitrotoluene, **24**, 681.
- β -Parabromo-sulphotoluene, **24**, 1055.
- Parabromotoluene, **25**, 696.
- Paracajputene, **14**, 65.
- Parachloro-metanitrotoluene, **24**, 680.
- Paracomic acid, **II**, 6.
- Paracyanogen, compound containing, **9**, 129.
- Paracyanogen, constitution of, **25**, 250.
- Paracymene, conversion of caoutchou into, **15**, 119.
- Paradiphosphonium-compounds, **14**, 105.
- Paraffin and the products of its oxidation, **21**, 466.
- compounds derived from, **25**, 803.
- detection and estimation of, in stearin candles, **25**, 526.
- effect of, in removing salts from solution, **22**, 144.
- of high melting point, **24**, 1183.
- oxidation of, by chromic acid, **21**, 467.
- oxidation of, by nitric acid, **21**, 469.
- production of olefines from, by distillation under pressure, **24**, 342.
- hitherto unobserved source of, **13**, 329.
- Paraffins, **24**, 896; **25**, 428.
- action of heat and pressure on, **25**, 802.
- commercial, determination of the melting and setting points of, **25**, 188.
- normal, **25**, 1083.
- refraction-equivalents of, **23**, 151.
- Paraguay tea, theine found in, **1**, 217, 238.
- Para-iodometanitrotoluene, **24**, 681.
- Para-iodo-metatoluidine, **24**, 681.
- Paralactic acid, convertibility of inosite into, **25**, 315.
- Paralbumin, **24**, 722.
- occurrence of, in serous transudates, **25**, 310.
- Paraldehyde, presence of, in the "first runnings" obtained in the manufacture of alcohol from sugar-beet, **24**, 1187.
- Para-meta-toluidine, **24**, 681.
- Para-meta-tolylenediamine, **24**, 565, 683.
- Paranaphthalene, constitution of, **15**, 44.
- Paranaphthalene, **15**, 45.
- Paranitraniline and nitraniline, **8**, 175.
- Para-ortho-tolylenediamine, **24**, 565, 683.
- Paraoxybenzoic acid, changes which it undergoes in the blood, **25**, 637.
- — iodised products of, **25**, 622.
- — acid, new source of, **24**, 369.
- Parapeptone, **14**, 260.
- Paraphenolsulphonic acid, **25**, 622.
- Parasorbic acid, **12**, 46; **25**, 488.
- Parasulphobenzoic acid, **24**, 704.
- Paratartaric ether, action of acetyl chloride on, **20**, 118.
- Paratartaric ether, action of benzoyl chloride on, **20**, 138.
- Paratartrate of thallium, **17**, 151.

- Parathionic acid (Gerhardt's), identity of, with ethyl-sulphuric acid, **25**, 606, 684.
- Paratoluenesulphamide, oxidation of, **25**, 622.
- Paratoluidine, derivatives of, **24**, 681.
- Parchment-paper used as a dialyser, **15**, 220.
- Parmelia saxatilis*, resinoid acid from, **25**, 639.
- Parsnip, analysis of, **2**, 18.
- Parsnips, analysis of the ash of, **9**, 46.
- Parting operations, loss of gold in, from solubility in nitric acid, **13**, 99.
- Parvoline, **7**, 100, 106.
- Parvoline in tobacco smoke, **24**, 1077.
- Patchouli, oil of, **17**, 12.
- Paviin, a second crystallisable fluorescent substance in the bark of the horse-chestnut, **11**, 17; **12**, 126.
- Paytime, **25**, 721.
- Pearl-ash and sal-ammoniac, products of the distillation of, with aqueous alcohol, **23**, 260.
- Peas, analysis of the ash of, **11**, 193.
- Peat, alkaloïds obtained from, **3**, 313.
- examination of a very compact Swedish, **24**, 211.
- Peaty soils, sterility of, due to the presence of ferrous sulphate and iron pyrites, **24**, 279.
- Pectic and parapectic acids, the spontaneous conversion of gun-cotton into, **16**, 91.
- Pectin, the gelatinous principle of vegetables, **1**, 409.
- Pectous modification of fluid colloïds, **15**, 217.
- Pelargonamine, platinum salt of, **15**, 362.
- Pelargone, **3**, 242.
- Pelargonic acid, **11**, 241; **3**, 240.
- Pelargonic benzoate or benzoic pelargonate, **6**, 187.
- Pelargonyl iodide from Boghead naphtha, **15**, 362.
- Pelargyl chloride, **3**, 241.
- Peltier's phenomenon and the thermoelectric force of metals, **25**, 779.
- Pentabromorein, **25**, 297.
- Pentacetodulcite, **25**, 400.
- Pentacetomonochlorhydrodulcite, **25**, 400.
- Pentacetyl-elecampene-inulin, **25**, 68.
- Pentacetyl-saccharose, **25**, 69.
- Pentachlorethane, action of bromine on, **25**, 232.
- Pentachlorethyl oxide, **24**, 515.
- Pentachloride of phosphorus. See Phosphorus Pentachloride.
- Pentachloride of tungsten, **25**, 287.
- Pentachloronaphthalene, **25**, 443.
- Pentachlororein, **25**, 297.
- Pentachlororein hypochlorite, **25**, 297.
- Pentamines, **11**, 268.
- Pentane, **25**, 1085.
- Pentasulphate of copper, **1**, 225.
- Pentasulphide of phosphorus, action of, on carbon tetrachloride, **25**, 452.
- Pentene, **25**, 1085.
- Pentiodides of the alkaloïds, **24**, 400.
- Peppermint camphor, **15**, 24.
- Peppermint oil, **17**, 12.
- — fluorescence of, **24**, 154.
- Pepsin, **24**, 733.
- action of, on the fibrin of blood, **25**, 63.
- artificial digestion of casein by, **24**, 731.
- new method of demonstrating and measuring the action of, **25**, 313.
- and bismuth, elixir of, **25**, 1144.
- Peptone, **14**, 257.
- Peptone, polarising, **15**, 413.
- Peptones, **24**, 410.
- Peptones, their destiny in the blood, **25**, 254.
- Peptones of fibrin, **25**, 629.
- Perchlorate of oxethyl-triethylphosphonium, **14**, 84.
- Perchlorate, thallious, **25**, 988.
- Perchlorates, **16**, 88.
- Perchloric acid and its hydrates, **16**, 82.
- Perchloric acid, aqueous, **16**, 87.
- Perchloric monohydrate, **16**, 86.
- Perchloride of carbon, absorption of its vapour by charcoal, **21**, 192.
- Perchlorides and permanganates, specific heat of, **19**, 201, 228.
- Perchloromethyl-mercaptan, **24**, 344.
- Perchlorophenols, **25**, 701.
- Perchlororubian, **12**, 215.
- Perchloroxynaphthalic acid, **14**, 217.
- Pereylyte from South Africa, **25**, 1051.
- Periodate of thallium, **25**, 987.
- Periodides of the alkaloïds, **24**, 929.
- Periodides of the organic bases, contribution to the history of, **18**, 99; **19**, 145.
- Periodides of quinine-bases, **24**, 398.
- Periodides of the strychnine bases, **24**, 399.
- Permanganate, alkaline, ammonia evolved by the action of, on organic nitrogen compounds, **21**, 161.
- Permanganate, alkaline, limited oxidation with, **20**, 301.
- Permanganate of hydrogen, reaction of, with hydrogen oxalate, **20**, 462.
- Permanganate of potassium, action of, on tartaric, citric, and oxalic acids, **25**, 608.

- Permanganate of potassium, action of, on urea, ammonia, and acetamide in strongly alkaline solutions, **21**, 25.
- — — action of, on vanadium tetrachloride, **23**, 348.
- — — determination of the amount of organic matters in drinking waters by means of a standard solution of, **16**, 62.
- — — influence of, on water charged with hydrogen dioxide under the influence of a freezing mixture, **25**, 921.
- — — preparation and uses of, **24**, 868.
- — — use of, in the galvanic battery, **25**, 279.
- — — use of, for estimating organic matters in waters, **18**, 120.
- Permanganic acid, decomposition of a solution of peroxide of hydrogen by, **16**, 320.
- Permian rocks of the Lower Odenwald, **25**, 796.
- Peroxskite, **25**, 294.
- Peroxide of acetyl, **17**, 272.
- Peroxide of barium, action of, on acetic anhydride, **21**, 497.
- — — experiments as to the reduction of metallic oxides by, **7**, 304.
- — — preparation of, **17**, 267.
- Peroxide of benzoyl, **17**, 268.
- Peroxide of butyl, **17**, 275.
- Peroxide of camphoryl, **17**, 277.
- Peroxide of chlorine, method of preparing, **11**, 193.
- Peroxide of cumenyl, **17**, 272.
- Peroxide of hydrogen, decomposition of chromic acid by, **16**, 326.
- — — decomposition of a solution of, by ferricyanide of potassium, **16**, 322.
- — — decomposition of a solution of, by hypochlorite of barium, **16**, 324.
- — — decomposition of a solution of, by permanganic acid, **16**, 320.
- — — estimation of, by solution of indigo, **25**, 922.
- — — oxidation effected by, **16**, 333.
- Peroxide of hydrogen and ozone, occurrence of, in the electrolysis of sulphuric acid, **7**, 251.
- Peroxide of iron, dialysis of sucrate of, **15**, 253.
- — — soluble, preparation of, by dialysis, **15**, 249.
- Peroxide of lead and sulphuric acid, action of, upon opianyl, **9**, 276.
- Peroxide of nitrogen, its vapour-density, **15**, 156.
- Peroxide of potassium, analysis of, **14**, 274.
- — — preparation of, **14**, 268.
- Peroxide of thallium, **17**, 132.
- Peroxide of tin, dialysis of, **15**, 255.
- Peroxide type, **16**, 290.
- Peroxide of uranium, dialysis of sucrate of, **15**, 254.
- Peroxide of valeryl, **17**, 276.
- Peroxides, alkaline, oxidation and deoxidation effected by, **16**, 316.
- Peroxides of barium, strontium, and calcium, preparation of, **25**, 880.
- Peroxides of lead, manganese, nickel, cobalt, &c., volumetric estimation of, **8**, 230.
- Peroxides, organic, theoretically considered, **17**, 281.
- Peroxides of potassium and sodium, **14**, 267.
- Peroxides of potassium and sodium, behaviour of, with various reagents, **14**, 281.
- Peroxides prepared by electrolysis, **24**, 306.
- Peroxides of the radicles of organic acids, **17**, 266.
- Peroxides of uniaxomic metals, **16**, 290.
- Persea gratissima*, **24**, 727.
- Persian berries, colouring matters of, **13**, 327.
- Persulphate of iron, basic, from Chile, **14**, 156.
- Peru gum as thickening material for printing, **24**, 768.
- Peruvian alloy, analysis of an ancient, **11**, 252.
- Peruvian bark. See Bark.
- Peruvian Matico, pharmaceutical and chemical characters of, **11**, 123.
- Petit grain*, oil of, **17**, 13.
- Petroleum, **24**, 1024, 1025.
- Petroleum, production of, in America, **24**, 868.
- Petroleum, American, the most volatile constituents of, **18**, 54.
- Petroleum, Canadian, caprylic alcohol from, **18**, 296.
- Petroleum of Pechelbronn, hydrocarbons from the, **25**, 886.
- Petroleum oils, determination of the igniting points of, **25**, 272.
- — — influence of sunlight on, **24**, 1025.
- Petroleums from Russia, physical properties and heating powers of, **24**, 453.
- Petroleum springs, application of oxygen to the freeing of, from paraffin, **25**, 186.
- Pharmacopæias, distilled waters of the, **11**, 261.

- Pharmacy, microscopical research in relation to, **18**, 31.
- Phenaconic and fumaric acids, identity of, **25**, 144.
- Phenamine, **3**, 96; **14**, 232.
- Phenetol, **3**, 78.
- Phenetolsulphonate of potassium, action of bromine on, **24**, 1040.
- Phenic acid, formation of, from benzol, **16**, 76.
- Phenol, action of, on ammonia, **24**, 123.
- action of, on aniline, **3**, 283.
- action of liquid phosgene on, **24**, 337.
- antidotes to poisoning by, **25**, 638.
- behaviour of albuminous matters and ferments with, **24**, 810.
- bromine-water as a test for, **24**, 1216.
- from glycerin, **25**, 61.
- oxidation of, **25**, 482.
- physiological and chemical action of, **25**, 627.
- presence of, in the animal body, and its action on the blood and nerves, **25**, 628.
- synthesis of a new, **25**, 241.
- transformation of, into alkaloïds, **25**, 247.
- transformations of, **24**, 122.
- use of, for detecting narceine and eurarine in chemico-legal investigations, **25**, 331.
- value of, as a disinfectant, **25**, 904.
- Phenol, benzylated, **25**, 702.
- Phenol colours, **24**, 910.
- Phenol hydrate, crystallised, **18**, 66.
- Phenol and creasote, distinction between, **25**, 929.
- Phenols, compounds of, with aldehydes, **25**, 301, 493.
- contributions to the history of the, **25**, 135.
- formation of, from aromatic hydrocarbons, **25**, 481.
- notes on the, **25**, 620.
- thermal effects of the combination of, with bases, **24**, 978.
- Phenols, bromonitro-, **25**, 861.
- Phenolsulphonic acids, reactions of, **25**, 146.
- Phenolsulphonic acid from sulphanilic acid, **24**, 826.
- Phenyl alcohol. See Phenol.
- Phenyl chloride, compound obtained by the action of fuming sulphuric acid on, **10**, 102.
- Phenyl compounds, **7**, 237—242.
- table of, **4**, 43.
- Phenyl compounds, use of, for the detection of nitric acid, **16**, 396.
- Phenyl cyanate, behaviour of, with triethylphosphine, **13**, 322.
- Phenyl dicyanate, action of phenol on, **24**, 394.
- Phenyl ethers, **24**, 1040.
- Phenyl ethers, mixed, formation of, **25**, 135.
- Phenyl group in aniline, methylation of the, **24**, 1060.
- Phenyl series, methylated phosphorus-urea of the, **13**, 324.
- Phenyl sulphocyanate, action of, upon triethylphosphine, **13**, 309.
- action of acetic acid on, **24**, 140.
- behaviour of the arsines and stibines with, **13**, 321.
- Phenyl-allyl ether, **25**, 687.
- Phenylamide, dibenzo-, (dibenzanilide), **6**, 197.
- Phenylammonium cobalticyanide, **24**, 390.
- Phenyl-benzyl ether, **24**, 909.
- Phenyl-benzyl-urea, **25**, 449.
- Phenyl-diazobromobenzolimide, **20**, 72.
- Phenylene-diacetic acid, **25**, 1013.
- Phenylene-diamine, **25**, 1024.
- Phenylene-diamine from bromonitramidobenzene, **25**, 1003.
- Phenylene-diamine obtained by decomposition of diamidobenzoic acid, **24**, 562.
- Phenylene group of phosphorus bases, **14**, 341.
- Phenylic ether, **24**, 123.
- Phenyl-hydroxyls, a reaction of free, **24**, 959.
- Phenylic mustard oil, chlorinated and iodated, **25**, 510.
- Phenylic xanthamide, **24**, 267.
- Phenylnaphthylamine, **25**, 1025.
- Phenyl oxide-disulphonic acid, **24**, 124.
- Phenylpurpuric acid, **24**, 239.
- Phenyl-sorbanide (sorbanilide), **12**, 51.
- Phenylsulphuric acid, constitution of, **24**, 959.
- Phenylsulphurous acid from sulphanilic acid, **24**, 826.
- Phenyltriethide, stannic, **24**, 225.
- Phenyltriethylammonium, platinum-salt of, **4**, 318.
- Phenylurethanes, formation of, **24**, 138.
- Phenylxylydine, **25**, 1025.
- Phillygenin, **8**, 188.
- Phillyrin, **8**, 187.
- Phloridzin, action of iodine chloride on, **17**, 331.
- Phloroglucin, yellow compound obtained by heating, with phthalic anhydride and sulphuric acid, **24**, 912.

- Phocæna communis*, flesh-juice of, **24**, 426.
- Pholerite, **24**, 10.
- Phorone from camphoric acid, **25**, 1011.
- Phosgene ether and ethyl iodide, action of sodium on a mixture of, **25**, 607.
- Phosgene gas, action of, on amyl hydrate, **1**, 370.
- Phosgene, liquid, action of, on amides, **25**, 718.
- Phosgene, liquid, action of, on some organic compounds, **24**, 312.
- Phosphammonium-compounds, **14**, 325.
- Phospharsonium-compounds, **14**, 332.
- Phosphate, ammonio-sodic, **25**, 673.
- Phosphate of calcium, occurrence of deposits of crystallised, in human urine, **15**, 8.
- occurrence of considerable deposits of crystallised, in teak-wood, **15**, 91.
- solubility of some forms of, **25**, 269.
- Phosphate of codeine, **4**, 114.
- Phosphate of didymium, **6**, 266.
- Phosphate of ethylene-hexethyl-disphosphonium, **14**, 100.
- Phosphate, hydrated calcio-aluminic, from Cornwall, **18**, 263.
- Phosphate, hydrated cerous, from Cornwall, **18**, 259.
- Phosphate of menaphthalamine, **9**, 11.
- Phosphate of phenyl, tribasic, **7**, 240.
- Phosphate of sodium, action of, on ammonium salts, **24**, 787.
- containing different quantities of water of crystallisation, amount of heat evolved or absorbed in the solution of, **24**, 1131.
- estimation of magnesia by, **1**, 186.
- Phosphate of thallium, **17**, 135.
- Phosphate, West Indian, **16**, 75.
- Phosphates, **1**, 384.
- action of caustic potash on, **6**, 53.
- action of sulphurous acid on, **25**, 39.
- analysis of, **11**, 186.
- effect of, in promoting the development of fungi in potable waters, **24**, 71.
- estimation of ammonia in soluble, by means of calcined magnesia, **25**, 89.
- estimation of reduced, **25**, 842.
- influence of different earthy, mixed with the food in the composition of the bones, **25**, 897.
- specific heat of, **19**, 201, 228.
- vegetable ashes rich in alkaline and earthy, **11**, 184.
- volumes occupied by, **11**, 418.
- Phosphates of bone-ash, solubility of, in carbonic water, **24**, 80.
- Phosphates of calcium, researches on, and upon the solubility of tricalcic phosphate, **19**, 296.
- Phosphates, mineral, comparative value of, **25**, 818.
- Phosphates of the organic alkalis, constitution of, **1**, 55.
- Phosphates, soluble, causes of high and low estimations of, **24**, 586.
- presence of, in cotton-fibre, seeds, &c., **20**, 303.
- Phosphates of thallium, **25**, 988.
- Phosphates, tribasic and bibasic, analysis of seed-ashes containing, **11**, 195.
- Phosphatic manures, analysis of, **25**, 326.
- Phosphide of copper fuses for firing gunpowder with magneto-electric apparatus, **14**, 185, 187.
- Phosphide of magnesium, **18**, 106; **20**, 309.
- of thallium, **17**, 135.
- of tungsten, **5**, 94.
- Phosphides, relation of, to amides, **12**, 87.
- Phosphides of iron, **25**, 881.
- Phosphides, metallic, **12**, 92.
- Phosphine, action of, on the iodides of ethyl and methyl, **24**, 569.
- action of, on zinc-ethyl, **24**, 568.
- derivatives of, corresponding with ethylamine and diethylamine, **24**, 713.
- primary and secondary, of the methyl series, **24**, 834.
- Phosphines, aromatic, **25**, 422.
- Phosphite of amyl, tribasic, **7**, 218.
- of barium, **20**, 359.
- of cadmium, **20**, 371.
- of calcium, **20**, 362.
- of cobalt, **20**, 366.
- of copper, **20**, 373.
- of iron, **20**, 373.
- of lead, **20**, 372.
- of magnesium, **20**, 362.
- of manganese, **20**, 368.
- of nickel, **20**, 365.
- of strontium, **20**, 361.
- of zinc, **20**, 369.
- Phosphites, constitution of, **20**, 358.
- Phosphoborate of sodium, **25**, 596.
- Phosphocerite, a mineral containing phosphate of cerium, analysis of, **2**, 131.
- Phosphoniobic acid crystallised from microcosmic salt, **24**, 804.
- Phosphonitrile, **22**, 18.
- Phosphoplatinic acid, **25**, 1091.
- Phosphoplatinic compounds containing toluidine, **25**, 826.

Phosphoplatinic ethers, **25**, 1090.
 Phosphoplatinous ether, ammonio-derivatives of, **25**, 1088.
 ——— reaction of, with zinc, **25**, 1088.
 Phosphoplatinum compounds, **25**, 791, 1088.
 Phosphorescence produced by increase of temperature, **25**, 119.
 Phosphorescence and fluorescence, relation between, **25**, 1061.
 Phosphoretted animal substances, behaviour of, when undergoing decomposition, **24**, 734.
 Phosphoretted hydrogen, decomposition of, by electric sparks, **24**, 306.
 ——— direct substitution of alcoholic radicals for hydrogen in, **24**, 407.
 ——— formation of the crystalline compound of hydriodic acid with, **10**, 210.
 ——— not acted upon by carbon sulphide, **13**, 309.
 ——— preparation of pure, **24**, 300.
 ——— spontaneous inflammability of, III, 355.
 ——— See also Phosphine.
 Phosphoretted substance in pus, **24**, 744.
 Phosphoric acid, absorption of, by soil, **21**, 2.
 ——— action of, on morphine, **25**, 652.
 ——— compounds of, with aniline, III, 227, 229.
 ——— compounds of, with lead oxide, **1**, 188.
 ——— compounds of, with manganous oxide, **1**, 388.
 ——— condition of, in soils, **25**, 838.
 ——— crystallised, **25**, 786.
 ——— estimation of, **23**, 383; **24**, 441, 583, 584.
 ——— estimation of, in iron ores, **15**, 337.
 ——— estimation of, by magnesia salts, **1**, 186; **16**, 304.
 ——— estimation of, by means of uranium, **25**, 178.
 ——— estimation of, and presence of, in some of the marls of the upper greensand formation, **1**, 44.
 ——— influence of an ammonium salt in the preparation of, by ammonium molybdate, **25**, 264.
 ——— of iron ores, separation and utilisation of, **25**, 931.
 ——— isomeric modifications of, **2**, 354.
 ——— osmose of, **8**, 59.

Phosphoric acid, precipitation of, **25**, 922.
 ——— precipitation of small quantities of, by ammonium molybdate, **24**, 157.
 ——— presence of, in the felspar of Jersey, III, 256.
 ——— retention of, by soils, **24**, 293.
 ——— separation of, from bases, by tin, **21**, 517.
 ——— separation of, from ferric oxide, alumina, lime, and magnesia, **25**, 920.
 ——— separation of lime and magnesia in combination with, II, 140.
 ——— separation and utilisation of, in iron ores, **24**, 1219.
 ——— specific gravity and atomic volume of, III, 92.
 ——— strength of solutions of, of various densities, **19**, 499.
 ——— titration of, by uranium solution, **24**, 753.
 ——— in vegetable ash, II, 189.
 Phosphoric acid and fluorine contained in different geological strata, **1**, 233.
 Phosphoric and arsenic acids, insoluble alkaline salts of, **2**, 359.
 Phosphoric and molybdic acids, combinations of, **1**, 394.
 Phosphoric bromide, reaction of, with sodium bromosulphobenzoate, **24**, 370.
 Phosphoric bromochloride, **25**, 282.
 Phosphoric bromochloride, molecular combinations of, with bromine, **25**, 670.
 Phosphoric chloride. See Phosphorus Pentachloride.
 Phosphoric oxychloride, action of, on borie anhydride, **25**, 669.
 Phosphoric sulphobromide, decomposition of, by water and alcohol, **25**, 282.
 Phosphoric sulphobromides, **25**, 983.
 Phosphoric sulphobromochloride, **25**, 283.
 Phosphorite, manuring with powdered, **25**, 839.
 Phosphorite, Russian, **25**, 56, 58.
 Phosphorous acid, some new compounds of, **7**, 216.
 ——— examination for, **24**, 759.
 Phosphorous chloride. See Phosphorus Trichloride.
 Phosphorus, action of ammonia on, **24**, 1159.
 ——— action of iodine on, **5**, 289.
 ——— action of, on nitrite of amyl, **11**, 250.
 ——— amount of, in various agricultural crops, III, 281.

- Phosphorus, behaviour of, with magnesium, **20**, 126.
- dissolved in carbon disulphide, action of, on a solution of blue vitriol, **24**, 953.
- its effects on the malleable qualities of iron and steel, **22**, 81.
- equivalent of, **4**, 223.
- estimation of in iron, **25**, 89.
- estimation of, in iron and steel, **19**, 148.
- estimation of, in pig-iron, steel, and malleable iron, **24**, 159.
- examination for, **24**, 759.
- fusion of, **1**, 183.
- influence exerted by electricity, platinum, and silver, on the luminosity of, **III**, 104.
- melted, specific gravity and atomic volume of, **III**, 76.
- modification of, **2**, 91.
- in pig-iron, **25**, 550.
- preparation of phosphoric acid from amorphous, **19**, 502.
- quantivalence of, **24**, 552.
- reciprocal transformation of the two allotropic states of, **24**, 1157.
- specific gravity and atomic volume of, **III**, 69, 91.
- spectrum of, **25**, 27.
- in steel, **21**, 282.
- symbol of, in Brodie's chemical calculus, **21**, 420.
- tissue-change in poisoning by, **24**, 946.
- in Wiltshire pig-iron (grey), **17**, 22, 23.
- Phosphorus, red, **5**, 94.
- absorbent power of, **24**, 1005.
- Phosphorus-bases, **24**, 568.
- amylene-group of, **14**, 341.
- benzylene-group of, **14**, 342.
- contributions to the history of, **13**, 289; **14**, 73, 316.
- diatomic, **14**, 89.
- ethylene-group of, **14**, 76.
- phenylene-group of, **14**, 341.
- propylene-group of, **14**, 341.
- theory of, **14**, 73.
- methylene-group of, **14**, 340.
- monatomic, **14**, 78.
- researches on, **11**, 56.
- series of mixed diatomic, **14**, 324.
- Phosphorus-bronze, **24**, 860.
- Phosphorus chlorides, **25**, 38.
- Phosphorus compounds, constitution of, **25**, 982.
- Phosphorus compounds containing nitrogen, **22**, 15.
- Phosphorus iodide, action of, on glycerin, **8**, 145.
- Phosphorus oxychloride, action of, on phosphoric anhydride, **25**, 39.
- new, **24**, 1160.
- use of, as a reagent in organic chemistry, **8**, 226.
- Phosphorus oxychlorides, amidated, **22**, 16.
- Phosphorus pentachloride, action of, on aciamides, **25**, 413.
- action of, on anthraquinone, **25**, 139.
- action of, on chloral-ethyl-alcoholate, **24**, 696.
- action of, on dichloraldehyde, **24**, 1190.
- action of, on glycerin, **5**, 315.
- action of, on orthobromobenzoic acid, **24**, 1055.
- action of, on sycocerylic alcohol, **15**, 73.
- action of sulphur on, **3**, 5.
- action of, upon tartaric acid, **13**, 9.
- decomposition of sulphuric acid by, **7**, 180.
- Phosphorus pentasulphide, action of, on carbon tetrachloride, **25**, 452.
- Phosphorus pentoxide, action of carbon tetrachloride on, **25**, 605.
- Phosphorus protochloride, syn. with Phosphorus trichloride or Phosphorous chloride.
- Phosphorus series, betaine of the, **24**, 1066.
- Phosphorus sulphobromide, **24**, 1163.
- Phosphorus sulphochloride, **25**, 38.
- Phosphorus sulphochloride, action of ammonia on, **18**, 1.
- Phosphorus sulphoperechloride, preparation of, **3**, 5.
- vapour-density of, **3**, 11.
- Phosphorus trichloride, action of, on ethylic dimethoxalate, **18**, 141.
- action of, on anhydrides and chlorides, **24**, 491; **25**, 222.
- action of bromine on, **25**, 385.
- action of, on ethylic diethoxalate, **18**, 133.
- action of, on ethylic lactate, **18**, 144.
- action of, on ethylic leucate, **18**, 133.
- action of, on ethylic ethio-methoxalate, **18**, 139.
- action of, on zinc-ethyl, **11**, 59.

- Phosphorus trichloride, decomposition of, by water, **24**, 660; **25**, 223.
 ——— latent heat of vapour of, **1**, 31.
 Phosphorus ureas, methylated, **13**, 324.
 Phosphorus and copper, compounds of, **18**, 249.
 Phosphorus and hydriodic acid, action of, on diapo-tetramorphine, **25**, 656.
 Phosphorus and nitrogen, compounds containing, **2**, 121.
 Phosphorus, nitrogen, arsenic, and antimony bases compared, **11**, 76.
 Phosphoryl trichloride, **25**, 38.
 Phosphoryl trichloride and bromodichloride, solidification of, **24**, 1162.
 Phosphostannic acid crystallised from microcosmic salt, **24**, 803.
 Phosphosulphate of sodium, **25**, 596.
 Phosphozirconic acid crystallised from microcosmic salt, **24**, 803.
 Photochemical researches by Bunsen and Roscoe, **8**, 193.
 Photographic effects of the electric spectra of different metals in air, **17**, 78.
 Photographic effects produced by transmitting electric sparks through gases other than atmospheric air, **17**, 83.
 Photographic image, invisible, **25**, 31.
 Photographic papers, mode of measuring the relative sensitiveness of, **18**, 183.
 Photographic papers, sensitive, contributions to our knowledge of the chemical action of sunlight upon, **19**, 33.
 Photographic process with silver bromide collodion, **25**, 1138.
 Photographic transparency of bodies, &c., **17**, 59.
 Photography, coloured, **24**, 867.
 Photography, copying of drawings by, **24**, 867.
 ——— on porcelain, **25**, 187.
 ——— preparation of collodion for, **25**, 532.
 ——— use of albumin and tannin in, **24**, 1151.
 Photolithographic processes, **24**, 1099; **25**, 855.
 Phthalein of hydroquinone, **24**, 911.
 Phthalein of resorcin, **24**, 911.
 Phthalic acid, derivatives of, **25**, 75.
 ——— electrolysis of, **24**, 917.
 ——— formation of, by oxidation of anthraquinone, **25**, 443.
 Phthalic acids, isomerie, **25**, 438.
 Phthalic aldehyde, **19**, 339.
 Phthalic anhydride, vapour-density of, **25**, 295.
 Phthalic chloride, reaction of, with naphthol, **24**, 1042.
 Phthalidine, **8**, 303.
 Physiological action of analogously constituted chemical compounds, **3**, 179.
 Pickeringite occurring in the slate of Nova Scotia, and the class of salts to which it belongs, **16**, 200.
 Picoline, occurrence of, amongst the products of the dry distillation of acrolein-ammonia, **24**, 539.
 ——— oxidation-products of, **24**, 144.
 ——— in tobacco-smoke, **24**, 1077.
 Pieranic acid, action of nitric acid on, **21**, 150.
 ——— formation of diazo-dinitro-phenol from, **18**, 269.
 Pierate of lead, spontaneous inflammability of silk loaded with, **25**, 531.
 Pierate of potassium, explosive force of, **24**, 648.
 Picric, or trinitrophenic acid, **14**, 243.
 ——— action of chloride of iodine on, **20**, 433.
 ——— dyeing of silk with, **14**, 250.
 ——— preparation of chloranil from, **21**, 144.
 ——— relative position of the three nitro-groups in, **25**, 17.
 ——— thermal effects of the combination of, with bases, **24**, 979.
 Pieric ether, **19**, 235.
 Piero-erythrin, **11**, 151.
 Pig-boiling, **25**, 554.
 Pig-iron, analysis of, **25**, 536—545.
 ——— occurrence of titanium in, &c., **16**, 387.
 ——— smelted from the Wiltshire oolitic iron ore, occurrence of vanadium in, **17**, 21.
 Pig-iron (grey) from Seend and Westbury in Wiltshire, silicon, sulphur, and phosphorus in, **17**, 22, 23.
 Pigments, biliary and urinary, **24**, 419.
 Pigments, arsenical, yellow and red, **25**, 268.
 Pigs, digestibility of cellulose by, **25**, 1036.
 Pinelic acid, a product of the oxidation of Chinese wax by nitric acid, **10**, 175.
 Pimento, essential oil of, **25**, 2.
 Pinacone, conversion of, into acetone by oxidation with chromic anhydride, **25**, 143.
 Pine timber, fichtelite from recent, **25**, 1083.
Pinus Larix, larixinic acid, a crystallisable principle found in the bark of, **16**, 310.
 Piperate of barium, **15**, 18.
 ——— of potassium, **15**, 18.
 Piperic acid, analyses of, **15**, 18.
 Piperic and hydropiperic acids, **15**, 17.
 Piperidic ethyl-urea, **6**, 178.
 Piperidic methyl-urea, **6**, 178.
 Piperidic urea, **6**, 177.

- Piperidine, an alkali derived from piperine, **6**, 175.
 — derivatives of, **24**, 1063.
 — hydriodide, **6**, 177.
 — hydrochloride, **6**, 176.
 — nitrate, **6**, 177.
 — oxalate, **6**, 177.
 — sulphate, **6**, 177.
 — sulphocarbonate, **6**, 178.
 Piperine and its decomposition-products, researches on the constitution of, **24**, 934.
 Piperine, detection of, **25**, 330.
 Piperine, oxidation of, **21**, 162.
 Piperonal, action of nascent hydrogen on, **24**, 934.
 Piperonal, action of phosphoric chloride on, **24**, 938.
 Piperonyl alcohol, **24**, 936.
 Piperonylic acid, action of barium hydrate, dilute hydrochloric acid, and water on, **24**, 937.
 — — action of nascent hydrogen on, **24**, 936.
 — — action of phosphoric chloride on, **24**, 939.
 — — synthesis of, **24**, 1050.
 Pisolitic iron ores from North Wales, **25**, 1054.
 Planorbis, hæmoglobin in, **25**, 255.
 Plant-food, its state of combination in the soil, **24**, 277, 296.
 — — nitrogen as, **25**, 1112.
 — — loss of, in soils by drainage, **24**, 276.
 Plant-growth, influence of ammonium sulphocyanate on, **25**, 917.
 Plant-juices, diffusion apparatus for extracting, **24**, 1100.
 Plants, absorption of humus bodies by, **25**, 1038.
 — — action of electricity on the coloured tissues of, **24**, 796.
 — — chemical substitution in, **24**, 428.
 — — determination of the quantity of vegetable ash in, **11**, 190.
 — — disengagement of ozone by the green parts of, **20**, 11.
 — — distribution of potash and soda in, **24**, 851; **25**, 86.
 — — effect of application of heat to the roots of, **11**, 222.
 — — formation of ozone by, **25**, 515.
 — — influence of spectrum colours on the decomposition of carbon dioxide by, **25**, 1107.
 — — influence of sulphur dioxide on, **25**, 1108.
 — — influence of the temperature of the soil on the development of certain, **25**, 167.
 — — inorganic constituents of, **11**, 179.
 Plants, mineral matter of, **25**, 642.
 — — nature of silicium-compounds occurring in, **25**, 910.
 — — do they assimilate free or uncombined nitrogen? **16**, 100, 111.
 — — power ascribed to the roots of, of rejecting poisonous or abnormal substances presented to them, **14**, 209.
 — — origin of the carbon fixed by, **25**, 158.
 — — pyrocatechin an element of living, **25**, 171.
 — — supplementary note to a memoir on the power ascribed to the roots of, of rejecting poisonous or abnormal substances presented to them, **15**, 16.
 Plaster of Paris, effects produced by the addition of, to must, **20**, 403.
 Plating with aluminium, **25**, 1134.
 Platinic chloride, action of, on conine, **1**, 358.
 — — action of sulphurous acid on, **24**, 891.
 — — crystallised, **25**, 600.
 — — osmose of, **8**, 59, 93.
 — — products of decomposition of narcotine by, **11**, 163, 168.
 — — reaction of, with oxide of triethylphosphine, **13**, 298.
 Platinidecyanides, composition of, **13**, 106.
 Platinised charcoal, **8**, 105.
 Platino-bisulphocyanides, reactions of, **7**, 42.
 Platino-bisulphocyanide of diplatosammonium, **7**, 39.
 — — of potassium, **7**, 32.
 — — of silver, **7**, 34.
 Platinochloride of amylamine, **15**, 361.
 — — of berberine, **15**, 344.
 — — of bromaniline, **11**, 293.
 — — of bromethyl-triethylarsonium, **14**, 336.
 — — of bromethyl-triethyl-phosphonium, **14**, 80.
 — — of caprylamine, **15**, 361.
 — — of chloraniline, **11**, 280.
 — — of chloroethylated-triethyl-phosphonium, **14**, 317.
 — — of chlorocodeine, **4**, 119.
 — — of Claudet's cobalt base, **4**, 355.
 — — of codeine, **4**, 114.
 — — of conine, **1**, 354.
 — — of cumidine, **1**, 8.
 — — of cyaniline, **1**, 167.
 — — of dibromomelaniline, **1**, 301.
 — — of dichloromelaniline, **1**, 299.
 — — of dinitromelaniline, **1**, 307.
 — — of di-iodomelaniline, **1**, 304.
 — — of dipyridine, **22**, 412.
 — — ethylaniline, **3**, 286.

- Platinochloride of ethylene-dipyridyl-diammonium, **14**, 164.
 — of ethylene-hexethyl-diarsonium, **14**, 338.
 — of ethylene-hexethyl-diphosphonium, **14**, 100.
 — of ethylene-hexethyl-phospharsonium, **14**, 333.
 — of ethylene-hexamethyl-diphosphonium, **14**, 324.
 — of ethylene-tetraphethyl-phosphammonium, **14**, 328.
 — of ethylene-triethyl-arsammonium, **14**, 399.
 — of ethylene-triethyl-phosphammonium, **14**, 325.
 — of ethyl-sparteine, **15**, 6.
 — of ethyl-toluidine, **7**, 70.
 — of iodaniline, **1**, 278.
 — of lophine, **9**, 224.
 — of melaniline, **1**, 294.
 — of narcaine, **5**, 256.
 — of nitraniline, **8**, 176.
 — of nitromesidine, **2**, 119.
 — of oenanthylamine, **15**, 361.
 — of oxethyl-triethyl-phosphonium, **14**, 84.
 — of pelargonamine, **15**, 362.
 — of sinealinc, **6**, 190.
 — of sparteine, **15**, 3.
 — of strychnine, **2**, 254.
 — of tetramethylphosphonium, **11**, 74.
 — of tetrethylphosphonium, **11**, 66.
 — of tetrethylphosphonium, crystalline form of, **14**, 110.
 — of thebaine, **5**, 261.
 — of trimethylamylphosphonium, **11**, 75.
 — of trimethylethylphosphonium, **11**, 75.
 — of trimethylphosphine, **11**, 73.
 — of vinyl-triethyl-arsonium, **14**, 337.
 Platinoeyanide of potassium, reaction of, with thallous carbonate, **24**, 461.
 — of beryllium, **24**, 1013.
 Platino-pyridine bihydrochloride, **18**, 180.
 Platino-sulphocyanides, action of ammonia on, **7**, 36.
 Platino-sulphocyanides, action of chlorine gas and nitric acid on, **7**, 40.
 Platino-tersulphocyanides, **7**, 25—32.
 Platino-tersulphocyanides and platino-bisulphocyanides, and their decompositions, **7**, 22.
 Platinum accompanying silver in solution in nitric acid, note on, **7**, 48.
 Platinum, amalgam of, **16**, 384.
 — cacodyl compounds containing, **1**, 63.
 Platinum, chemical effects produced by, **11**, 17.
 — decomposition of water by, at a white heat, **11**, 332.
 — elementary allotropism of, **11**, 97.
 — fused, absorption of hydrogen by, **20**, 267.
 — influence exerted by, on the luminosity of phosphorus, **11**, 104.
 — modification of the reactions of, by citric acid, **10**, 117.
 — passage of gases through, at a red heat, **20**, 257.
 — its reflecting power for the chemical rays, **17**, 77.
 — researches on the metals accompanying, in the ore, **7**, 256.
 — separation of, from iridium, **25**, 49.
 — specific gravity and atomic volume of, **11**, 62, 72.
 Platinum-bases, **19**, 345.
 Platinum black, new process of preparing, **25**, 790.
 Platinum chloride, a new, **25**, 680.
 Platinum compounds, researches on various, derived from the green salt of Magnus, **1**, 189.
 Platinum compounds, new series of, **24**, 1009; **25**, 791.
 Platinum crucibles, loss of weight of, in a gas-flame, **25**, 266.
 Platinum pyrophosphotriamate, **19**, 12.
 Platinum salts of various amines, **4**, 313—326.
 Platinum, spongy, effect of, in facilitating the decomposition of potassium chlorate, **24**, 1154.
 — — specific gravity of, **11**, 69.
 Platinum spongy and wrought, absorption of hydrogen by, **20**, 269.
 Platinum sulphide and bisulphide, specific gravities and atomic volumes of, **11**, 89.
 Platinum and lead, alloy of, **24**, 202, 1166.
 Platinum and thallium, alloy of, **17**, 147.
 Platinum and thallium, double chloride of, **17**, 147.
 Platosammonium, sulphocyanide, **7**, 38.
 Plumbethyls, or plumbides of ethyl, **7**, 268.
 Plumbic salts. See Lead Salts.
 Plumbocalcite from Carinthia, **24**, 204.
 Plumbo-cupric arsenate, hydrated (bayldonite), from Cornwall, **18**, 265.
 Plumbosquithide, formation of, **13**, 187.
 Plumbostib from Nertschinsk, composition of, **24**, 671.
 Poison obtained from arrows, **11**, 154.

- Poisonous metals, application of electrolysis to the detection of, in mixtures containing organic matters, **13**, 12.
- Poisonous substances, power ascribed to the roots of plants of rejecting, **14**, 209.
- Polarisation, circular. See Circular Polarisation.
- Polarisation, circular, method of testing reciprocal decomposition by, **13**, 308.
- Polarisation, electric, of metallic surfaces in aqueous solutions, a new method of obtaining electricity from mechanical force, **24**, 101.
- Polarisation in a voltaic element, measurement of, **25**, 381.
- Polariscope, **24**, 441.
- Polarised light, action of gastric juice on, **15**, 413.
- Polarising crystals, produced by the action of iodine on quinine sulphate, **5**, 177.
- Polarising peptone, **15**, 413.
- Polarising substances, influence of temperature on the molecular rotatory power of some, **25**, 970.
- Pollen, chemical composition of, **1**, 1.
- Pollen and the formation of wax, **25**, 639.
- Polycrase, composition of, **25**, 200.
- Polygonum bistortum*, examination of, **1**, 212.
- Polymorphism, **III**, 93.
- Polymorphous substances, differences exhibited by, **III**, 57.
- Pomegranate rind, examination of, **1**, 213.
- Populin, **5**, 8.
- Populus balsamifera*, action of nitric acid on extract of, **4**, 213.
- Porcelain, action of vanadium on, **23**, 358.
- Porcelain, Berlin, analysis of, **2**, 154.
- Porcelain photography, **25**, 187.
- Porphyroxine, **15**, 455.
- Porpoise, flesh-juice of, **24**, 426.
- Portland cement, **25**, 336.
- Potable waters. See Waters, **24**, 66.
- Potash, action of bromine on, **15**, 478.
- action of, on datiscine and datiscetine, **9**, 233.
- compound of boric methide with, **15**, 379.
- estimation of, in urine by tartaric acid, **25**, 1124.
- heat disengaged in the neutralisation of various acids and acid salts by, **II**, 51—68.
- inconveniences presented by the substitution of soda for, **25**, 266.
- Potash, quantitative separation of magnesia and of the oxides of nickel, cobalt, and zinc from, **2**, 99.
- red prussiate of. See Potassium Ferricyanide.
- retention of, by the soil, **24**, 293.
- separation of, from magnesia, **24**, 955.
- specific gravity and atomic volume of, **II**, 84.
- supposed incapability of, to form ultramarine, **24**, 451.
- Potash, alcoholic, reaction of, with nitrate of amyl, **20**, 583.
- Potash, alcoholic, reaction of, with nitrite of amyl, **20**, 577.
- Potash, anhydrous, proportions of, in aqueous potash-ley of different specific gravities, **III**, 176.
- Potash, caustic, action of, on potassium phosphates, **6**, 53.
- Potash, caustic, behaviour of some oxides with, in presence of oxide of chromium, **6**, 54.
- Potash salts. See Potassium Salts.
- Potash soap, **25**, 934.
- Potash and soda, distribution of, in plants, **24**, 851; **25**, 86.
- — proportions of, in plants grown under different circumstances, **14**, 215.
- — variation in the proportion of, present in certain samples of barley grown in plots of ground artificially impregnated with one or other of these alkalis, **5**, 9.
- Potashes, analysis of, **25**, 1041.
- Potassio-thallic chloride and iodide, **25**, 988.
- Potassium, action of, on amyl nitrite, **11**, 248.
- action of, on chloraniline, **II**, 285.
- action of, on oxalic ether, **22**, 441.
- action of, on vegetation, **25**, 165.
- as an agent of separation in quantitative analysis, **I**, 98.
- combination of carbonic oxide with, **12**, 269.
- crystallised, **13**, 122.
- decomposition of minerals by, **24**, 1200.
- products of the action of, on cyanide of ethyl, **1**, 60.
- purification of, **14**, 269.
- as a reducing agent, **I**, 97.
- solubility of, in liquid ammonia, **24**, 310.
- specific gravity and atomic volume of, **III**, 63, 76.
- spectrum produced by, **13**, 278.
- separation of, from sodium, **25**, 175.

Potassium acetate, action of chloro-
pierin and chloroform on, **18**, 31.
— — — diffusion of, in alcohol, **15**,
228.
— — — reaction of, with nitrate of
ethyl, **20**, 584.
Potassium-alcohol, action of the iodides
of ethyl, methyl, and amyl on, **4**, 106
— 108.
Potassium-allantoïn, **24**, 1200.
Potassium amalgam, **24**, 890.
— — — amylonitrophosphite, **11**, 251.
— — — anchoates, **10**, 171, 173.
— — — auro-sulphide, **1**, 244.
— — — azophosphate, **3**, 151.
— — — bassiate, **2**, 234.
— — — benzoglycollate, **5**, 76.
— — — bibromacetate, **12**, 4.
— — — bibromosuccinate, **13**, 104.
— — — bicarbonate, diffusion of, **4**, 103.
— — — bichromate, action of phosphorous
chloride on, **25**, 222.
— — — and mercury chloride, double
salt of, **1**, 21.
Potassium bicomenate, **4**, 365.
— — — bisulphate, osmose of, **8**, 60.
— — — compound of, with hydride
of methyl-salicyl, **20**, 420.
— — — spontaneous combustion of,
24, 1167.
Potassium bromacetate, **11**, 23.
Potassium bromide, diffusion of, **4**, 99.
Potassium bromoeoumarilate, **24**, 49.
Potassium cadmio-chloride, cadmio-
bromide, and cadmio-iodide, **1**, 106.
Potassium carbonate, action of arsenious
acid on, at 212° F. and at a low red
heat, **15**, 281, 287.
— — — action of boracic acid on, at
a bright red heat, **12**, 181.
— — — preparation of, **1**, 5 (p);
3, 106; **25**, 1075.
— — — products of the distillation
of sal-ammoniac with, **23**, 259.
— — — strength of solutions of, of
different specific gravities, **11**, 178.
Potassium chlorate. See Chlorate of
Potassium.
Potassium chloride, diffusion of, **4**, 97.
— — — industrial out-turn of a layer
of, at Kalutz in Galicia, **25**, 336.
Potassium chlorochromate, **25**, 47.
Potassium chloromaleate, **13**, 10.
Potassium chloroplatinocyanide, **13**,
112.
Potassium chromate, action of, on man-
ganous sulphate, **1**, 30 (p).
— — — neutral, and mercury chlo-
ride, double salt of, **1**, 22.
— — — neutral, and mercury cyanide,
double salt of, **1**, 23.
Potassium coumarilate, **24**, 47.

Potassium cyanate, isomeric, **24**, 391.
— — — preparation of, **1**, 97.
Potassium cyanide, action of, on allyl
iodide, **25**, 890.
— — — action of, on dichloroacetic
acid, **25**, 401.
— — — combinations of metallic
cyanides with, **11**, 82, 92.
— — — preparation and applications
of, **1**, 94.
Potassium cyanurate, acid, **1**, 62.
— — — diazo-amidoanisate, **18**, 313.
— — — diazo-amidobenzoate, **18**, 301.
— — — diazo-amidotoluate, **18**, 316.
— — — disulphometholate, **9**, 246.
— — — ethonide, **1**, 150.
Potassium-ethyl, formation of, **13**,
191.
— — — properties of, **13**, 192.
Potassium ethylate, action of, on oxalic
ether, **22**, 445.
Potassium ferriocyanide, decomposition of
a solution of peroxide of hydrogen
by, **16**, 322.
— — — preparation of, **9**, 128.
— — — solubility of, **7**, 80.
— — — valuation of commercial,
7, 79.
Potassium ferriocyanide and caustic alkali,
action of a mixture of, on colouring
matters, **11**, 320.
Potassium ferrocyanide, action of sul-
phuric acid on, **1**, 251.
— — — preparation and formation of,
1, 2 (p).
Potassium hemipinates, **5**, 265.
Potassium hydrate, action of boracic acid
on, at a red heat, **14**, 144.
— — — action of, on ethyl-crotonic
acid, **18**, 138.
— — — action of fused, on bromisa-
tin, **11**, 289.
— — — action of fused, on chlorisatin,
11, 272.
— — — action of fused, on dibrom-
isatin, **11**, 294.
— — — action of fused, on dichlor-
isatin, **11**, 285.
— — — action of fused, on isatin, **11**,
271.
— — — action of, on methacrylic acid,
18, 143.
Potassium hydrate, action of, on methyl-
crotonic acid, **18**, 141.
— — — action of molten, on sulphoxy-
benzoic acid, **24**, 1052.
Potassium hydropiperate, **15**, 21.
Potassium hydrosulphate, compound of,
with oil of mustard, **8**, 184.
Potassium insolinate, **9**, 213.
Potassium iodate, oxidising power of,
25, 1074.

- Potassium iodide, action of mercuric oxide of, **25**, 987.
 ——— curious form of crystallisation of, **5**, 136.
 ——— diffusion of, **4**, 99.
 ——— manufacture of, from the mother-liquors of kelp, **25**, 1130.
 ——— reaction of, with cupric sulphate, **2-4**, 581.
 Potassium iodochromate, **2-4**, 801.
 ——— manganate, influence of solar rays on, **11**, 313.
 ——— metaphosphate, **III**, 280.
 ——— nitrite, action of, on ethyl chloracetate, **25**, 608.
 ——— nitrococcusate, **III**, 472.
 ——— nitrotoluylate, **III**, 436.
 ——— canthylate, formation of, **1**, 5.
 ——— permanganate, action of, on tartaric, citric, and oxalic acids, **25**, 608.
 ——— oxidation of conglutin from lupines by, **25**, 830.
 Potassium peroxide, analysis of, **1-4**, 274.
 ——— platino-bisulphocyanide, **7**, 32.
 ——— platino-tersulphocyanide, **7**, 25.
 ——— pyrophosphotriamates, **19**, 10.
 ——— quadrurate, **15**, 212.
 Potassium salts, compounds of, with cane-sugar, **2-4**, 270.
 ——— determination of the solubilities and specific gravities of certain, **25**, 566.
 ——— osmose of, **8**, 73 - 82.
 ——— physiological action of, **25**, 314.
 ——— sterility caused by excess of, in soils, **2-4**, 280.
 ——— use of, as manure, **2-4**, 279.
 ——— their sources and use as manures, **25**, 523.
 Potassium selenites, **2**, 55.
 ——— selenocyanide, **4**, 13.
 ——— sulphate, osmose of, **8**, 80.
 ——— sulphide, compound of, with oil of mustard, **8**, 185.
 ——— sulphite, **2**, 206.
 ——— action of, on bodies containing CCl_3 , **25**, 388.
 Potassium sulphocaprylate, **7**, 288.
 ——— sulphocoumarilate, **2-4**, 51.
 ——— sulphhydrate, its action on acetic ether, **17**, 418.
 ——— sulphocyanate, isomeric, **2-4**, 391.
 ——— tetroxide, action of carbonic oxide on, **1-4**, 284.
 ——— action of nitric oxide on, **1-4**, 288.
 Potassium toluylate, **III**, 431.
 Potassium and bismuth oxalate, **1**, 76.
 Potassium and cadmium bromide, **8**, 255.
 Potassium and cadmium chloride, **8**, 253.
 Potassium and cadmium sulphate, **8**, 256.
 Potassium and chromium oxalate, **1**, 89.
 Potassium and chromium oxalate, red, **1**, 93.
 Potassium and copper chromate, **3**, 73.
 Potassium and didymium sulphate, **6**, 272.
 Potassium and glucinum carbonate, **8**, 247.
 Potassium and glucinum oxalate, **8**, 247.
 Potassium and gold cyanide, **11**, 88.
 Potassium, iron and copper, complex cyanide of, **15**, 357.
 Potassium and palladium sulphopalladate, **2-4**, 317.
 Potassium and sodium auro-sulphides, **1**, 236.
 Potassium and sodium chlorides, diffusion of a mixture of, **15**, 230.
 Potassium and sodium insolinate, **9**, 214.
 Potassium and sodium peroxides, **1-4**, 267.
 Potassium and sodium sulphate, **6**, 106.
 Potassogypsite, a native sulphate of potassium and calcium, **3**, 348.
 Potato, analysis of, **2**, 19.
 Potatoes, proportion of starch in various sorts of, **25**, 1111.
 Potatoes, field experiments with, **25**, 912.
 Potato-starch sugar, sugar-colours for beer, &c., from, **25**, 938.
 Potato-testing with solution of "salt," **25**, 188.
 Poultry dung, examination of fresh and commercial, **25**, 643.
 Prasin, **25**, 105.
 Precipitates, colour of, when exposed to the solar rays, **11**, 316.
 ——— thermo-chemical researches on the formation of, **25**, 107.
 Precipitation and evaporation, balance between, **25**, 1038.
 Precipitation, influence of the solar rays on, **11**, 312.
 Precipitation of dilute silver-solutions by the chlorides, bromides, and iodides of hydrogen and the alkali-metals, **25**, 25.
 Prehnitic acid, **2-4**, 372.
 Prehnomalic acid, **2-4**, 372.
 Pressure, compressibility of liquids under high, **25**, 974.
 ——— effect of, on the absorption of gases by charcoal, **2-4**, 76.
 ——— influence of, on endosmose and exosmose, **25**, 974.

- Pressure, influence of, on fermentation, **25**, 570.
 — influence of, on the lines of the spectrum, **25**, 664.
 Pressure of the atmosphere, influences of changes in, on the phenomena of life, **25**, 831, 1029.
 — influence of, on the light of combustion, **15**, 177.
 — influence of, on the rate of combustion, **15**, 170.
 Pressure and volume, changes of, produced by chemical combination, **24**, 975.
 Prickly comfrey (*Symphytum aspernum*), composition and nutritive value of, **24**, 1082.
 Prime factors, apparent exceptions to the law of, **21**, 454.
 Printing calico with coal-tar colours, **14**, 252.
 Printing-colours for artificial alizarin, **25**, 188.
 Printing on stuffs, new method of, by means of metallic precipitations, **25**, 855.
 Prism, use of, in qualitative analysis, **10**, 79.
 Productiveness of land, conditions of, **24**, 278.
 Productive powers of soils in relation to loss of plant-food by drainage, **24**, 276.
 Projectiles, lead-coated cast-iron, voltaic action observed in, **16**, 235.
 Proof-spirit, composition of, III, 447, 452.
 Propacetate, ethylic, **20**, 109.
 Propargylic alcohol, **25**, 686, 807.
 Propargylic ether, **24**, 527.
 Propargylic ether, preparation of, **25**, 480.
 Propionamide, **24**, 234.
 Propionanilide, **24**, 234.
 Propione, **4**, **1**; **25**, 892.
 Propione, action of nitric acid on, **4**, 6.
 — analysis of, by limited oxidation, **20**, 231.
 — produced from carbonic oxide and sodium-ethyl, oxidation-products of the, **19**, 326.
 Propionic acid, composition of, III, 386.
 — conversion of lactic acid into, **12**, 23.
 — derivatives of, **24**, 234.
 — formation of, by oxidation of allylene, **25**, 142.
 — formation of, from amylic alcohol, **19**, 333.
 — formation of, from carbon oxide and ethylate of potassium or sodium, **25**, 143.
 — formation of, by fermentation of cane-sugar, **7**, 276.
 Propionic acid, formation of, from β -hexylene, **19**, 492.
 — formation of, by oxidation of oleic acid, III, 239.
 — formation of, from propylamine, **19**, 487.
 — Keller's supposed formation of, by means of flour and leather, **5**, 28.
 — method of obtaining in large quantities, **3**, 190.
 — preparation of, by the action of carbonic acid on sodium-ethyl, **11**, 103.
 Propionic aldehyde, preparation of, **24**, 1030.
 Propionitrile, preparation of, **9**, 249.
 Propionyl chloride, conversion of, into normal propyl alcohol, **24**, 229.
 Propyl alcohol of fermentation, **25**, 837.
 Propyl alcohol, normal, conversion of propionyl chloride into, **24**, 229.
 — normal, synthesis of, **25**, 234.
 — normal, synthesis of, from ethylic alcohol, **24**, 1030.
 — normal, transformation of allyl alcohol into, **25**, 998.
 Propyl aldehyde, **9**, 188.
 Propyl bromide, **24**, 523.
 Propyl chloride, **24**, 808.
 Propyl compounds derived from the propyl alcohol of fermentation, **22**, 193.
 Propyl compounds, normal, **25**, 235.
 Propyl glycol, **19**, 270.
 Propyl hydride in American petroleum, **18**, 56.
 Propyl hydride, production of, from methyl-bromacetol, **25**, 239.
 Propyl iodide, normal, boiling point and specific gravity of, **25**, 231, 235.
 Propyl propionate, preparation of, by oxidation of propyl alcohol, **24**, 903.
 Propylamine, oxidation of, **19**, 487.
 Propylene, **3**, 111; **8**, 147.
 — bromine-compound of, **3**, 115.
 — compounds of, **24**, 808.
 — derivatives of, **19**, 274.
 — formation of, **8**, 305.
 — formation of, from marsh-gas and carbonic oxide, **17**, 45.
 — formation of propylic alcohol from, **8**, 149.
 — preparation of, **3**, 114.
 Propylene bromide, action of nascent hydrogen, hydriodic acid, and water on, **25**, 237.
 — two isomerides of, **25**, 683.
 Propylene chloride, **3**, 119.
 — action of nascent hydrogen, hydriodic acid and water on, **25**, 238.

- Propylene chloride and chlorobromide, preparation of, **25**, 889.
- Propylene chloriodide, structure of, **24**, 1027.
- Propylene cyanide: its preparation and conversion into pyrotartaric acid, **15**, 139.
- Propylene, dichlorinated, **25**, 805.
- Propylene-group of phosphorus bases, **14**, 341.
- Propylic ethers, normal, **24**, 1032.
- Propyl-methyl ketone, **24**, 385.
- Propylo-butyric ether, **8**, 149.
- Proteids, action of water on, **24**, 731.
- decomposition of, by bromine and water, **24**, 1069.
- metamorphosis of, in the bodies of ruminants, **24**, 728.
- occurrence of aspartic and glutamic acids among the decomposition-products of, **24**, 721.
- relation of, to the carbohydrates, **24**, 1069.
- Proteids vegetable, leucine obtained from, **24**, 719.
- Protocatechuic acid, **16**, 353.
- constitution of, **24**, 827, 829.
- formation of, from piperonylic acid, **24**, 937.
- preparation of, from oxybenzoic acid, **24**, 829.
- Protocatechuic aldehyde, new method of preparing, **24**, 1050.
- Protochloride of tin, diffusion of, **4**, 94.
- valuation of, **7**, 50.
- valuation and composition of, **4**, 239.
- Protopine, **24**, 1065; **25**, 724.
- Protosulphide of carbon, Baudrimont's, **13**, 248.
- Protoxide of copper from Chile, **14**, 154.
- Protoxide of copper, hydrated: its solubility in aqueous hyposulphite of soda, **16**, 29.
- Protoxide of nitrogen, its action on binoxide of sodium, **14**, 285.
- action of electric discharge on, **13**, 361.
- electric spectra of metals in, **17**, 86.
- Protoxide of thallium, **17**, 128.
- Proximate analysis of acids of the lactic series, **22**, 76.
- Prussian blue, curious formation of, **1**, 35.
- formation of, on the surface of gravel, through the medium of ferrocyanide of calcium, **1**, 47 (p).
- neutral, dialysis of, **15**, 252.
- preparation of, **1**, 117.
- Prussiate of potash, red, **7**, 77.
- Prussiate of potash, mode of estimating the value of, **6**, 31.
- Prussiates. See Ferro- and Ferri-cyanides.
- Prussic acid, conversion of, into methylamine, **16**, 249.
- Prussic acid, medicinal, estimation of hydrocyanic acid in, **4**, 219.
- Pseudobutyl alcohol, formation of, from butyrene, **25**, 411.
- Pseudoceraïn, examination and analysis of, **1**, 251.
- Pseudocorallin, **25**, 705.
- Pseudoerythrin, **1**, 76.
- Pseudomorphine, **15**, 455; **25**, 722.
- Pseudomorphs, two new, **24**, 672.
- Pseudotoluidine, **25**, 823.
- Pseudotoluidine, sulpho-urea corresponding with, **25**, 720.
- Ptychotis Ajuan*, **9**, 231, 239.
- volatile oil of, **8**, 289.
- Pucherite, **25**, 131.
- Puddle-process, dephosphorising, for the preparation of good bar iron from phosphorised pig, **25**, 1135.
- Puddle-process, Dermoy's, **25**, 1143.
- Puddling furnace, Danks's, **25**, 931, 1134.
- Puddling furnaces, Spencer's rotatory, **25**, 940.
- Puddling furnaces, working of ordinary, compared with that of the Siemens' regenerative furnace, **24**, 446.
- Puddling of iron, **25**, 555.
- Puddling by machinery, **25**, 557.
- Pulmonary capillaries, tension of the gases of the blood in the, **25**, 311.
- Pulse from South Russia, composition of, and of the legumin obtained from it, **25**, 915.
- Punamu. See Nephrite.
- Purple, aniline, **14**, 233.
- Purple of Cassius, composition of, **25**, 377.
- Purpurin, **3**, 254; **5**, 62; **12**, 200.
- Purpurin, spectrum of, **23**, 142.
- Purpurin and alizarin, distinctive spectra of, **17**, 305.
- Purpurin and alizarin, optical characters of, **12**, 219.
- Purton saline water, analysis of, **14**, 43.
- Pus, action of, on sugar-solutions, **23**, 393.
- Pus, chemical composition of, **27**, 744.
- Pus-corpuscles, chemical constitution of, **24**, 742.
- Pus-corpuscles and serum, origin and ultimate fate of, **24**, 745.
- Putrefaction, alkaloids obtained from, **3**, 314.
- Putrefaction and analysis of human bile, **14**, 127.

- Putrefaction of bile, **14**, 118.
 Putrefactive processes and disinfection, **24**, 841.
 Putrid ox-bile, analysis of, **14**, 126.
 Pyrene, **15**, 44; **24**, 117, 690; **25**, 445.
 — vapour-density of, **25**, 295.
 Pyrene-quinone, **24**, 691.
 Pyridine, **5**, 53.
 — action of dibromide of ethylene on, **14**, 161.
 — constitution of, **24**, 145.
 — formation of, from azodimaphthyl-diamine, **18**, 181.
 — formation of, from naphthalene, **18**, 9.
 — products obtained from, by heating with sodium, **22**, 407.
 — in tobacco-smoke, **24**, 1077.
 Pyrite, crystalline form of, **25**, 56.
 Pyrites burners, preparation of thallium from the flue-dust of, **17**, 118.
 Pyrites, capillary, **24**, 1176.
 Pyrites, estimation of sulphur in, **25**, 842.
 Pyrites of Iowa coal, relative proportion of iron and sulphur in certain specimens of, **25**, 228.
 Pyrites, magnetic, **24**, 326.
 Pyrites, preparation of thallium from, in the wet way, **17**, 117.
 Pyrocatechin, formation of, from cellulose and other carbohydrates, **24**, 226.
 Pyrocatechin, an element of living plants, **25**, 171.
 — green liquid obtained by heating, with phthalic and sulphuric acids, **24**, 912.
 — in Kino, **25**, 296.
 — production of, from carbohydrates, **24**, 849.
 Pyrochlore, composition of, **25**, 201.
 Pyrocogenic acid, **11**, 6.
 Pyrocogenic and paracogenic acids, **11**, 6.
 Pyroelectric properties of topaz, **24**, 669.
 Pyrogallate of lead, **1**, 130.
 Pyrogallie acid, **1**, 127, 132.
 — astringent substances, a source of, **1**, 132.
 — effect of active oxygen upon, **25**, 703.
 — oxidation of, by electrolysis, **24**, 918.
 — preparation of, **4**, 222.
 Pyrogilding, **25**, 1134.
 Pyromecenate of copper, **11**, 3.
 — of iron, **11**, 4.
 Pyromecenes, metallic, **6**, 79, 80.
 Pyromeconic acid, **11**, 2, 5.
 Pyromeconic acid, action of bromine on, **6**, 81.
 — salts and decomposition-products of, **6**, 78.
 Pyromellitic acid, reaction of, with naphthol, **24**, 1042.
 Pyromorphite, didymium in, **25**, 995.
 Pyromuric acid, **11**, 5.
 Pyrophosphanic acid, **17**, 237; **21**, 65.
 Pyrophosphate, cupric, allotropic, **20**, 439.
 — normal, **20**, 437.
 Pyrophosphate, ferric, allotropic, **20**, 438.
 — normal, **20**, 436.
 Pyrophosphates, specific heat of, **19**, 201, 228.
 — transformations of, **25**, 596.
 Pyrophosphodiamates, **19**, 295.
 Pyrophosphodiamic acid, **17**, 237; **19**, 290; **21**, 67.
 Pyrophosphonitrylic acid, **22**, 19.
 Pyrophosphoric acid, **20**, 435.
 — allotropic salts of, **20**, 438.
 — double salts of, **1**, 183.
 — formation and constitution of, **20**, 440.
 — normal salts of, **20**, 436.
 Pyrophosphoric amides, **21**, 61.
 Pyrophosphoric sulphobromide, **25**, 983.
 Pyrophosphotriamates, **19**, 4.
 Pyrophosphotriamic acid, **19**, 1; **21**, 68.
 Pyrophotography, **25**, 856.
 Pyroplating, **25**, 1045.
 Pyraccenic or pyruvic acid, **19**, 267.
 Pyraccenic acid: conversion of, into lactic acid, **16**, 260.
 Pyraccenic acid: its relation to malonic and tartaric acids, **16**, 263.
 Pyraccenic and acetic acid, action of zinc on a mixture of, **16**, 262.
 Pyroretinite, distinction of, from rothornite, **24**, 1175.
 Pyrosulphophosphoric ethyl-ether, **25**, 985.
 Pyrosulphuric acid, some reactions of, **25**, 669.
 Pyrosulphuryl chloride, action of phosphorous chloride on, **25**, 222.
 Pyrotartanal, **8**, 172.
 Pyrotartanilate of ammonia, **8**, 173.
 Pyrotartanic acid, **8**, 172.
 Pyrotartaric acid, **1**, 399.
 — anilides of, **8**, 172.
 — formation of, from cyanide of propylene, **15**, 139.
 — new modification of, **25**, 1094.
 — synthesis of, **15**, 134.
 Pyrotartaronitril, **8**, 174.

Pyrotartaronitrilic acid, **8**, 174.
 Pyroxylic spirit, **1**, 36.
 ——— table of specific gravities of,
 1, 38.
 Pyroxylin, **III**, 415.
 Pyrrol-bases, **5**, 51, 55.
 Pyruvic acid, action of, on silver oxide,
 III, 360.
 Pyruvin, **25**, 400.

Q.

Quadoxalate of potassium, **II**, 67.
 Quadrochloramyl sulphide, **13**, 44.
 Quadrurate of potassium, **15**, 212.
 Qualitative analysis, general routine of,
 for metals, **18**, 97.
 ——— of substances insoluble in
 water and in acids, **18**, 226.
 ——— use of the prism in, **10**, 79.
 Quantitative analysis by limited oxida-
 tion, **20**, 173.
 Quantitative determination by circular
 polarisation, **15**, 308.
 Quartary monamidic acids, **12**, 103.
 Quartenylic acid, **24**, 814.
 Quartz, atomic volume and specific
 gravity of, **III**, 96.
 Quartz-bricks, English, analysis of, **25**,
 1046.
 Quartz-bricks, manufacture of, **24**,
 1079.
 Quartz-crystals from Striegau in Silesia,
 25, 55.
 Quartz-porphry, analysis of, **24**, 1171.
 Querecin, **13**, 327.
 Quercitrin, **13**, 327.
 Quicklime, use of, in the blast-furnace
 mixture, **25**, 800.
 Quicksilver lute, a simple, **25**, 528.
 Quinamine, **25**, 720.
 Quinicine, **6**, 274; **25**, 101.
 Quinidine, **6**, 275.
 Quinidine, formation of, from quinoidine,
 25, 721.
 Quinidine and cinchonidine, action of
 heat on, **6**, 276.
 Quinimetric process, new, **25**, 1128.
 Quinine, **25**, 1100.
 ——— action of certain reagents on, **3**,
 191.
 ——— alteration of the white blood-cor-
 puscles by, **25**, 254.
 ——— compound of, with iodide of mer-
 cury, **11**, 100.
 ——— constitution of, **7**, 278.
 ——— estimation of, **25**, 1014.
 ——— influence of, on oxidation in the
 blood, **24**, 1202.
 ——— reaction of, having relation to its
 fluorescence, **22**, 174.

Quinine, reactions of, **25**, 1043.
 Quinine iodosulphate, **11**, 133.
 Quinine nitrate, **7**, 278.
 Quinine phosphate with three equiva-
 lents of quinine, **1**, 58.
 Quinine sulphate, **7**, 278.
 ——— oxidation of, **21**, 165.
 ——— polarizing crystals produced
 by the action of iodine on, **5**, 177.
 Quinine and cinchonine, combinations
 of, with hydroferrocyanic and hydro-
 ferriecyanic acid, **1**, 407.
 Quinine bases, action of hydracids on,
 24, 931.
 Quinine bases, periodides of, **24**, 398.
 Quinoidine, **6**, 276; **25**, 106.
 ——— formation of quinine from, **25**,
 721.
 Quinoline or chinoline, colouring mat-
 ters of, **14**, 244.
 Quinone, constitution of, **23**, 134.
 Quinone, formation of, by oxidation of
 phenol, **25**, 482.
 Quinone-derivatives of naphthol, **25**,
 241.
 Quintanes, **24**, 1026.

R.

Racemate of lead, **1**, 25.
 ——— of silver, **1**, 24.
 ——— of sodium and ammonium, **3**, 80.
 Racemates, **3**, 82.
 Racemic acid, **3**, 79, 82.
 ——— anilides of, **8**, 181.
 ——— method of separating, into
 the two tartaric acids, right and left,
 6, 277.
 ——— osmose of, **8**, 59.
 ——— retardation of the precipita-
 tion of barium sulphate by, **10**,
 117.
 ——— transformation of the two
 kinds of tartaric acid into, **6**, 277.
 Radical, compound, definition of, **13**,
 246.
 Radicals, alcohol-, constitution of the,
 and formation of ethyl, **3**, 405.
 Radicals, alcohol-, formulæ of, **3**, 124.
 Radicals, organic, **22**, 343.
 Radicals, organic, chemical constitution
 and nature of, **3**, 369; **4**, 41.
 ——— formation of organic bases by
 the direct substitution of, for the
 hydrogen in ammonia, **11**, 278, 287.
 ——— isolation of, **2**, 263.
 ——— Frankland's researches on
 the: Part I, ethyl, **2**, 263; Part II,
 amyl, **3**, 30; Part III, action of solar
 light on ethyl iodide, **3**, 322.

- Radicals of the organic acids, peroxides of the, **17**, 266.
- Radish, analysis of, **2**, 16.
- Rain, impurities in, at Manchester and its neighbourhood, **11**, 212.
- Rain accompanied by meteoric dust, examination of, **25**, 1082.
- Rain-water, composition of, **25**, 33.
- nitrous and nitric acid in, **25**, 87.
- alternate predominance of nitrous and nitric acid in, **25**, 381.
- normal constituents of, **25**, 324.
- Ralstonite, **24**, 1019.
- Rammelsbergite, **25**, 129.
- Rarefaction of the air; its influence on the light of combustion, **15**, 177.
- Rate of combustion, influence of atmospheric pressure on, **15**, 170.
- Rays, chemical, absorption of, by reflection from polished surfaces, **17**, 76.
- absorption of, by transmission through gases, **17**, 72.
- absorption of, by transmission through liquids, **17**, 71.
- absorption of, by transmission through solids, **17**, 62.
- absorption of, by transmission through vapours, **17**, 72.
- Re-agents, presence of arsenic in certain, **13**, 338.
- Reciprocal decomposition in alcohol, **15**, 308.
- Reciprocal decomposition of salts, experiments illustrative of, **9**, 144.
- Red chalk, analysis of, **16**, 79.
- Red coloration of white lead, **25**, 881.
- Red colour-printing with artificial alizarin, **24**, 603.
- Red fire, **24**, 970.
- Red lead, manufacture of, **25**, 182.
- Red (magenta-), or fuchsine, **14**, 237.
- Red phosphorus, **5**, 94.
- Red prussiate of potash. See Ferri-cyanides.
- Red-short iron, **25**, 561.
- Reducing agents, action of, on tyrosine, **22**, 291.
- Refined iron, **25**, 554.
- Refining of gold when alloyed with tin or antimony, so as to render it fit for the purposes of coinage, **13**, 31.
- Reflection, coloured, relation of, to absorption, **17**, 315.
- Refraction and dispersion of light in silver iodide, chloride, and bromide, **24**, 653.
- Refraction in selenium, **25**, 26.
- Refraction-equivalents, **23**, 101.
- Refraction-equivalents of the aromatic hydrocarbons and their derivatives, **23**, 147.
- Refractive energy, specific, of elements and their compounds, **18**, 108.
- Regenerative gas-furnace, description of, **21**, 287.
- Regenerative gas-furnace, as applied to the manufacture of cast steel, **21**, 279.
- Reinsch's process, distinction of deposit obtained in, from salts of mercury, **24**, 161.
- Report on the alleged adulteration of pale ales with strychnine, **5**, 173.
- Report on the application of sewage to agriculture, **10**, 272.
- Report, chemical, on the cause of the fire in the "Amazon," **5**, 34.
- Report on original gravities, **5**, 229.
- Report on patents connected with the reduction and purification of iron, and the manufacture and purification of steel, **10**, 125.
- Resin, diffusion in alcohol of a solution of, **15**, 228.
- Resin of *Ficus rubiginosa*, **15**, 62.
- Resin, fossil, perhaps related to the amber-producing Flora, **24**, 892.
- Resin, fossil, from the Val d'Arno Superiore, **25**, 469.
- Resin, rothornite, a new fossil, **24**, 1171.
- Resin of the *Xanthoræa hastilis*, III, 10.
- action of nitric acid on, III, 12.
- Resistance, electric. See Electric Resistance.
- Resistance, measurement of the internal, of voltaic batteries by the compensation method, **24**, 649.
- Resorcin, azo-compounds of, **24**, 830.
- Resorcin colours, **24**, 911.
- Resorcin, derivatives of, **24**, 227.
- Resorcin-indophane, **25**, 895.
- Resorcin, mononitro-, **25**, 1007.
- Resounding flames, **25**, 279.
- Respiration of animals, quantity of carbonic acid produced by, **10**, 252.
- Respiration, the chemistry of, a process of dissociation, **25**, 252.
- Respiration of fishes, **25**, 637.
- Respiration of the larvae of *Tenebrio molitor*, **25**, 836.
- Respiration, quantity of air required for, **10**, 254.
- Restormelite, **23**, 165.
- Retisterene, **15**, 44.
- Rhamnetin, **13**, 327.
- Rhamnetin, reaction of lead-compound of, with diacetyl-saccharose, **25**, 71.
- Rheotome, **14**, 169.
- Rhingau, chemical examination of some specimens of wine from the, **1**, 78.
- Rhizomes of *Triticum repens*, constituents of the, **25**, 840.

- Rhodicone, **25**, 3.
 Rhodium, specific gravity and atomic volume of, **III**, 62.
Rhodomenia palmata, mannite contained in, **II**, 138.
 Rhubarb, some constituents of, **10**, 298.
 — detection of turmeric in powdered, **24**, 761.
 — leaf-stalks of garden, as sources of malic acid, **I**, 193.
 Ricinohamide, composition of, **4**, 362.
Ricinus communis, or castor-oil plant, alkaloid contained in the seeds of the, **17**, 195.
Ricinus communis, examination of the products of the oxidation of the oil of, **I**, 1.
 River-water, filtration of, **25**, 940.
Roccella tinctoria, substances contained in, **III**, 144.
 Roccellic acid, **III**, 153.
 Rock from Botallack, Cornwall, **24**, 111.
 Rock formation, certain processes of, now in action, **16**, 30.
 Rocks, analytical researches on, with reference to their constituents absorbable by plants, **24**, 429.
 Rocks, Cornish, **24**, 110.
 Rocks, Permian, of the Lower Odenwald, **25**, 796.
 Rocks of various ages, produce obtained from barley sown in, **7**, 289.
 Rock-salt, formation of, **24**, 310.
 Roman chamomile, contributions to the chemical history of, **25**, 171.
 Root-crops, field experiments on, **24**, 1083.
 Roots of plants, effect of the application of heat to, **14**, 222.
 Roots of plants, power ascribed to the, of rejecting poisonous or abnormal substances presented to them, **14**, 209.
 Roots of plants, supplementary note to a memoir on the power ascribed to, of rejecting poisonous or abnormal substances presented to them, **15**, 16.
 Roots, quantity of sugar in various sweet, **9**, 42.
 Roots and stubble remaining in the field after harvest, quantity and composition of, **25**, 262.
 Rosaniline, constitution of, **24**, 835.
 Rosaniline, new mode of decomposition of, **25**, 419.
 Rose, essential oil of, **17**, 13 ; **25**, 12.
 Roseine, **14**, 236.
 Roseine, dyeing of silk with, **14**, 250.
 Roseine, dyeing of wool with, **14**, 251.
 Rosemary, oil of, **17**, 13.
 Rose-naphthalene, or Magdala-red, dyeing of silk with, **24**, 1223.
 Rosco-cobaltic iodosulphate, derivatives of, **24**, 1169.
 Roses, attar of, **25**, 937.
 Rosewood, oil of, **17**, 13.
 Rosolic acid, **11**, 1 ; **14**, 244.
 Rosthornite, a new fossil resin, **24**, 1174.
 Rotation, optical, observed in healthy urine, **14**, 39.
 Rotatory power, optical, of gastric juice, **14**, 256.
 Rotatory powers (molecular), table of, **13**, 258.
 Rowley-rag, devitrification of, **21**, 257.
 Rubber. See Caoutchouc.
 Ruberythric acid, **12**, 216.
 Rubiacic acid, **12**, 204.
 Rubiacin, **12**, 203.
 Rubiadin, rubiafin, and rubiagin, **12**, 213.
 Rubian, **12**, 210.
 — action of sulphuric and hydrochloric acids on, **5**, 60.
 — composition of, **5**, 60.
 — preparation of, **5**, 58.
 — properties of, **5**, 59.
 — and its products of decomposition, **5**, 56.
 Rubianic acid, **12**, 216.
 Rubianin, **5**, 61 ; **12**, 213.
 Rubichloric acid, **12**, 205.
 Rubidine in tobacco-smoke, **24**, 1077.
 Rubidium in beet-root, **25**, 908.
 Rubidium salts, preparation of, from lepidolite, **25**, 880.
 Rubiretin, **5**, 60, 61 ; **12**, 213.
 Rue-oil, synthesis of, **24**, 387.
 Ruficarmin, **25**, 704.
 Ruficocein, **24**, 913 ; **25**, 704.
 Rufigallie acid, **25**, 216.
 Rufigallie acid, constitution of, **25**, 1098.
 Rugby sewage. See Sewage.
 Ruminants, metamorphosis of albuminous substances in the bodies of, **24**, 728.
 Russian summer rye, **25**, 1036.
 Rutilene, **25**, 436.
 Rye, analysis of the ash of, **II**, 193.
 Rye, Russian summer, **25**, 1036.
 Rye-flour, examination of, for foreign admixtures, **25**, 320.
 Rye-grain, proportion of fat and wax in, **24**, 1193.
 Rye-straw, proportion of fat and wax in, **24**, 1193.

S.

- Sabadilla seeds, alkaloids of, **25**, 828.
 Sabadilline, **25**, 828.

- Sabatrine, **25**, 828.
 Saccharate of sodium chloride, **24**, 572.
 Saccharimeter, Soleil's, **14**, 27.
 Saccharimetry, new process of, **25**, 463.
 Saccharine liquids, hydrometer for, **25**, 976.
 Saccharine matter found on the leaves of a lime tree, **25**, 316.
 Saccharometer and hydrometer, mode of reducing the indications of the, to each other, **1**, 16 (p).
 Safranine, **25**, 826.
 — preparation of, **25**, 271.
 Sahlite, occurrence of, in the Pennine Alps, **25**, 291.
 St. Michael's Bay, Normandy, analysis of sand from, **11**, 257.
 Sal-ammoniac, products of the distillation of, with chalk, **23**, 252.
 — products of the distillation of, with sodium carbonate, **23**, 260.
 — strength of solutions of, of different specific gravities, **11**, 193.
 — from Vesuvius, **24**, 1016.
 Sal-ammoniac and pearl-ash, products of the distillation of, with aqueous alcohol, **23**, 260.
 Salicin, action of iodine chloride on, **17**, 331.
 — constitution of, **24**, 960.
 Salicyl compounds, **7**, 60.
 Salicyl hydride, derivatives of, **20**, 418.
 — absorption of its vapour by charcoal, **21**, 188.
 — action of acetic anhydride on, **20**, 586.
 Salicyl series, benzylic derivatives of the, **21**, 122.
 Salicylamide, benzo- and cumo-, **6**, 196.
 Salicylate, benzoic, **5**, 129.
 Salicylic acid, **8**, 182.
 — absorption of its vapour by charcoal, **21**, 189.
 — anhydrides of, **25**, 819.
 — formation of, from anthranilic acid, **5**, 133.
 — formation of, from the bromobenzoic acid melting at 155° , **25**, 463, 624.
 — heat produced by the combination of, with bases, **24**, 980.
 — iodised products of, **25**, 622.
 Salicylic and coumaric acids, formation of, from coumarin, **11**, 212.
 Salicylic ether, action of barium hydrate on, **2**, 28.
 — derivatives of, **3**, 78.
 Salicylide, formation of, by the action of PCl_5 on salicylic acid, **25**, 216.
 Salicylite of sodium, action of ethyl iodide on, **20**, 422.
 Salicylite of sodium, action of methyl iodide on, **20**, 418.
 Saligenin, reaction of the sodium derivative of, with acetyl-glucose, **25**, 70.
 Saline compounds, heat disengaged in the formation of, **6**, 257.
 Saline constituents of water, estimation of, **18**, 129.
 Saline residues of the salt works at Nauchem, preparation of thallium from, **17**, 119.
 Saline solutions, action of dilute, on lead, **25**, 679.
 — densities of, **24**, 987.
 — freezing of, **25**, 781.
 — solidifying temperatures of, **25**, 1062.
 Saline substances, an attempt to determine the molecular weights of, **25**, 1068.
 Salicetin, **24**, 540.
 Salt, common, action of, on chlessylite, **22**, 24.
 — influence of, on the amount of sulphur evolved from coal by distillation, **11**, 235.
 Salt of iron precipitated from ethereal solution of meconic acid, **11**, 116.
 Salt, green, of Magnus, researches on the various platinum compounds derived from the, **1**, 189.
 Salt, remarkable, deposited from the mother-liquors obtained in the manufacture of soda, **25**, 660.
 Salt-cake, average composition of, **20**, 409.
 — manufacture of, **2**, 216.
 Salt gardens and salt trade of Portugal, **25**, 816.
 Salt meat, brine of, **17**, 405.
 Salt plants, **24**, 1209.
 Salt, sea-, silver in, **3**, 69.
 Salt springs of Nova Scotia, dense brine from, **18**, 46.
 Salted herrings, existence of trimethylamine in the brine of, **7**, 63.
 Salts, action of normal and acid, on ammonium salts, **24**, 785.
 — argument of the binary theory of, derived from the non-action of the anhydrous oxygen-acids on organic colours, **1**, 332.
 — class of, to which pickeringite belongs, **16**, 200.
 — constitution of, **4**, 350; **16**, 274.
 — decomposition of, by ammonia, **11**, 244.
 — decomposition of, by chlorine, **11**, 234.
 — decomposition of, by diffusion, **3**, 268.
 — disappearance of the volume of the

- acid, and in some cases of the volume of the base, in the crystals of highly hydrated, **1**, 139.
- Salts, expansion by heat of, in the solid state, **1**, 121.
- experiments illustrative of the reciprocal decomposition of, **9**, 144.
- heat disengaged in the solution of, in water, **6**, 241.
- influence of, on the crystallisation of sugar, **2-4**, 456, 457.
- means of preserving the crystals of, as permanent objects for microscopic investigation, **11**, 71.
- nomenclature of, **23**, 22.
- transport of, by the electric discharge, **2-4**, 882.
- volume occupied by certain hydrated, rendered anhydrous, **11**, 433.
- volumes occupied by, **11**, 466.
- volumes occupied by certain, containing a large amount of hydrate water, **11**, 412.
- laws which regulate the volumes of, **11**, 476.
- Salts, acid, constitution of, in solution, **23**, 875.
- Salts and acids, constitution of, **7**, 1.
- Salts, ammoniacal, **11**, 460.
- Salts, bleaching, **1**, 6.
- Salts, each constituent of which is coloured, chromatic phenomena of, **10**, 89.
- Salts, ferric, reduction of, by vegetable substances, **11**, 120.
- Salts insoluble in water, solvent power exercised by a solution of sodium hyposulphite upon, **16**, 28.
- Salts, metallic, action of stannic diethyl on, **16**, 22.
- decomposition of, by an electric current, **11**, 255.
- state of, in solution, **25**, 214.
- Salts, neutral, of uric acid, **1**, 343.
- Salts, soluble, chemical action of water on, **11**, 36.
- effect of, on the crystallisation of sugar, **22**, 121.
- in the Greenland meteorites, **25**, 991.
- Salylic acid, **1-4**, 56.
- Sambucene, **23**, 3.
- Sand, determination of the silica of the, in vegetable ash, **11**, 186.
- Sand from St. Michael's Bay, Normandy, analysis of, **111**, 257.
- Sandbergerite, **2-4**, 327.
- Sandstone, variegated, of the eastern rim of the Thuringian basin, **2-4**, 209.
- Santal wood, oil of, **17**, 13.
- Santal wood oil, hydrocarbon from, **25**, 6.
- Santorin, gas evolved from, after the eruption of 1866, **25**, 885.
- Saponification of spermaceti by caustic potash, **5**, 84.
- Saponite, **2-4**, 326.
- Sappanin, **25**, 818.
- Sarcine, **10**, 121.
- Sarcolactic acid, **2-4**, 546.
- Sarcolactic acid in urine, **2-4**, 423.
- Saussurite, **2-4**, 324.
- Scheelite, crystalline form of, **25**, 227.
- Schlippe's salt, **25**, 41.
- Schrötter's red phosphorus, **5**, 94.
- Scoparine, preparation and properties of, **4**, 217.
- Scott's cement, the so-called, **25**, 92.
- Scurvy-grass, analysis of, **2**, 5.
- Sea-air, amount of carbonic acid contained in, **20**, 189.
- Sea-kale, analysis of, **2**, 7.
- Sea-water, analysis of deep, **2-4**, 141.
- calcium iodate in, **25**, 597.
- detection of gold in, **25**, 1119.
- estimation of carbonic acid in, **25**, 455.
- quantities of gases dissolved in, **23**, 36.
- results of analysis of, performed on board H.M.S. "Porcupine," **23**, 16.
- Sea-weed as a manure, **25**, 1111.
- Sea-weeds, occurrence of mannite in, **136**.
- Sebacic acid, formation of, by distilling ricinoleic acid with potash, **4**, 362.
- Sebacic ether, action of ammonia on, **4**, 334.
- Sebamie acid, **4**, 337.
- Sebamide, **4**, 335.
- Sebin, **6**, 286.
- Secondary currents, use of, for accumulating and transforming the effects of the galvanic battery, **25**, 589.
- Secondary extract formation, influence of, in fermenting mashies, **2-4**, 1223.
- Secondary iodides, formation of, from olefines, **25**, 433.
- Secondary lactic acids, **22**, 64.
- Secondary monamines. See Monamines.
- Sediment deposited by the River Nile in Lower Egypt, analysis of, **4**, 133.
- Sediment, decomposition of the ordinary amorphous, in urine, by washing with water, **15**, 206.
- Sediment, determination of amount of, in waters, **18**, 118.
- Sedum acre*, chemical examination of, **25**, 1034.

- Seed-ashes containing tribasic and bi-basic phosphates, analyses of, **11**, 195.
- Seeds, apparatus for the extraction of oil from, **24**, 868.
- germination of, **24**, 718.
- influence of germination on the amount of fat in, **25**, 317.
- percentage of fat in various, **24**, 1193.
- quantity of sugar in various, **9**, 12.
- soluble phosphates in, **20**, 303.
- Seeds, oleaginous, germination of, **24**, 1207.
- Seed iron ore, analysis of, **17**, 28.
- Selenaldine, **III**, 310.
- Selenethyl and its compounds, **7**, 93—95.
- Selenic acid, volumetric estimation of, **8**, 282.
- Selenide of stibethyl, **5**, 70.
- Selenide of thallium, **17**, 137.
- Selenious acid, properties of, **2**, 53.
- Selenious anhydride, absorption-spectrum of, **25**, 382.
- Selenious chloride and bromide, absorption-spectra of the vapours of, **25**, 665.
- Selenite, crystalline form of, **25**, 227.
- Selenites, metallic, **2**, 57—68.
- Selenium, absorption-spectrum of the vapour of, **25**, 665.
- allotropy of, **5**, 90.
- density of, in different states, **5**, 93.
- electrical conducting power of vitreous and crystalline, **5**, 93.
- melting points of, **5**, 91.
- new facts about, **24**, 660.
- presence of, in sulphuric acid of French manufacture, **25**, 595.
- refraction and dispersion in, **25**, 26.
- specific gravity and atomic volume of, **III**, 91.
- spectrum of, **24**, 1145, 1146.
- symbol of, in Brodie's chemical calculus, **24**, 414.
- Selenium sulphide, **24**, 995.
- Selenocyanate of mercury, compound of, with mercuric chloride, **4**, 16.
- Selenocyanates, or Selenocyanides, metallic, **4**, 10—19.
- Selenovaleraldehyde, **24**, 560.
- Senna, Alexandrian, purgative principles of, **24**, 1068.
- Sericic acid, **24**, 380.
- Serous transudates, occurrence of paralbumin in, **25**, 310.
- Serpentine, conversion of, into tadjerite, **24**, 535.
- Serpentine, grey, constitution of, **25**, 603.
- Serpentine from Iona, **24**, 5.
- Serpentine from the Lizard, **24**, 113.
- Serpentinous rock, Menheniot, Cornwall, **24**, 112.
- Serradella seed, feeding value of, **25**, 612.
- Serum albumin, decomposition of, by heating with water, **24**, 733.
- Serum of pus, origin and ultimate fate in, **24**, 745.
- Sesquicarbonyl chloroplatinite, **24**, 1012.
- Sesquichloride of iron, diffusion of, **4**, 93.
- Sesquichloride of thallium, **17**, 139.
- Sesquioxide of iron, determination of, when mixed with alumina and titanite acid, **15**, 331.
- Sesquioxide of iron and alumina, separation of, by potash, **15**, 331.
- Sesquioxide of iron and titanite acid, separation of, **15**, 332.
- Sesquioxide of iron, alumina, and titanite acid, separation of, **15**, 333.
- Seven-carbon ether, **4**, 233.
- Sewage, ammonia per gallon, and estimated value of total constituents in one ton of, at different dilutions, **19**, 101.
- analysis of manure prepared from, **10**, 282.
- application of, to agriculture, **10**, 272.
- crops to which it is most applicable, **19**, 104.
- experience of common practice in the utilisation of, **19**, 122.
- quantities of, applied, and of green grass obtained per acre per annum, in experiments made at Rugby, **19**, 108.
- relation of, to Peruvian guano in amount of nitrogen reckoned as ammonia, **19**, 103.
- results of direct experiment on the utilisation of, **19**, 107.
- Sewage of Croydon, partial analysis of, before application of the drainage-water from the irrigated land, and of the River Wandle, above and below the drainage outfall from the irrigated land, **19**, 121.
- Sewage of Edinburgh, analysis of, **10**, 286.
- Sewage, Metropolitan, grains of ammonia per gallon in different samples of, and estimated value of the constituents in one ton, **19**, 90.
- Sewage of Rugby, ammonia and solid matter in mixed samples of, **19**, 93.
- — — mean composition of, **19**, 94.
- — — detailed composition of sam-

- ples of, before application, and of the drainage-water from the irrigated land, collected July, 1864, **19**, 118.
- Sewage of Rugby, mean composition of, before application, and of the drainage water from the irrigated land in the seasons of 1862 and 1863, **19**, 116.
- Sewage, town, composition and value of, **19**, 87.
- Sewaged, and unsewaged grass, results obtained at Rugby on cows fed on, **19**, 112.
- Sewage-irrigated meadows at Edinburgh, table relating to, **19**, 122.
- Sewage-mannure, probable effects of, when applied by irrigation, **24**, 297.
- Sewage-water, irrigation by, **10**, 287.
- Sewage-works at Croydon, **10**, 284.
- Sewer, gases generated in a, **3**, 13.
- Shale, bituminous, of Dorsetshire, volatile bases produced by destructive distillation of the, **7**, 97.
- Sheep, assimilation of meadow hay, clover-hay, and mangolds by, **24**, 1074.
- Sheep, change of material in the adult, under uniform feeding, **24**, 729.
- Shot-drill experiments, to determine the amount of actual energy developed in the body compared with that of muscle consumption, **21**, 43.
- Siderite, pseudomorphous, **25**, 227.
- Siemens' regenerative furnace, comparison between the working of, and that of the ordinary puddling furnace, **24**, 416.
- Silica, constitution of, **25**, 127.
- detection of fluorine when accompanied by, **5**, 151.
- estimation of, in waters, **15**, 474.
- infusorial, use of, **24**, 764.
- observations on, **15**, 107.
- in roasted coffee, **9**, 43.
- specific gravity and atomic volume of, **11**, 92.
- vegetable ashes rich in, **11**, 184.
- Silica colloid, organic appearances in, **21**, 224.
- Silica, soluble or gelatinous, deposits of, in the lower beds of the chalk formation, **6**, 102.
- Silica and titanic acid, determination of, in fire-bricks, **15**, 322.
- Silicate of gelatin, **15**, 246.
- Silicate of sodium, production of, by decomposition of common salt with silicic acid, **21**, 254.
- Silicate of sodium, use of, in soap-making, **25**, 340.
- Silicate and carbonate of sodium, action of, on cotton-fibre, **18**, 70.
- Silicates, alkaline, decomposition of, by diffusion, **17**, 324.
- — use of gauze for the preparation of, **24**, 763.
- Silicates, determination of alkalis in, **24**, 442.
- formulæ of, **14**, 152.
- occurrence of baryta in, **24**, 674.
- specific heat of, **19**, 199, 226.
- Siliceous calamine, from Scharley in Upper Silesia, **24**, 1178.
- Siliceous minerals containing iron, analysis of, &c., **15**, 311.
- Silicic acid, action of, upon hydrate of barium at a red heat, **14**, 150.
- — action of, upon hydrate of potassium, at a red heat, **14**, 149.
- — action of, upon hydrate of sodium at a red heat, **14**, 150.
- — aleogel and alcocol of, **17**, 321.
- — amorphous, as mordant for colouring matters, **24**, 452.
- — determination of, in Bohemian glass, **11**, 299.
- — etherogel of, **17**, 322.
- — glycerogel and glycerocol of, **17**, 322.
- — hydrogel and hydrosol of, **17**, 322.
- — pectization of, **17**, 319, 324.
- — properties of, and of other analogous colloidal substances, **17**, 318.
- — separation of crystalline, from watery solutions, **25**, 670.
- — preparation of soluble, by dialysis, **15**, 244.
- — sulphogel of, **17**, 323.
- Silicic and carbonic acids, state of combination of, in water, **25**, 525.
- Silicic ether, chlorhydrin of, **24**, 918.
- Silicic ether, reduction-products of, **25**, 806.
- Silicic ethers, reduction-products of, **24**, 1037.
- Silichloroform and its derivatives, **25**, 153.
- Silicide of hydrogen, composition of, **25**, 155.
- Silicium. See Silicon.
- Silicofluoride of ethylene-hexethyl-diphosphonium, **14**, 98.
- Silicoformic anhydride, **25**, 154.
- Silicoformic ether, tribasic, **25**, 155.
- Silicoheptyl compounds, **25**, 156, 609.
- Silicoheptyl ether, **24**, 1039.
- Silico-molybdic acid, yellow precipitate containing, **24**, 159.
- Silicon in carbonaceous substance existing in grey cast-iron, **14**, 202.

- Silicon, condition of, in iron and steel, **24**, 107.
 — in steel and bar iron, **25**, 1136.
 — dry process for the estimation of, in cast-iron, wrought-iron, and steel, **24**, 1212.
 — in pig-iron, **25**, 547.
 — in Wiltshire pig-iron (grey), **17**, 22, 23.
 — new form of, **8**, 242.
 — specific heat of, **19**, 193.
 — spectrum of, **24**, 1147.
 — in steel, **21**, 283.
 — symbol of, in Brodie's chemical calculus, **21**, 433.
 — apparent volatilisation of, **24**, 997.
 Silicon chlorides, **24**, 999.
 Silicon compounds occurring in plants, nature of, **25**, 910.
 Silicon compounds, spectra of, **25**, 27.
 Silicon-diethylehlorethin, **24**, 1038.
 Silicon-diethylketone, **24**, 1038.
 Silicon-diethylketonic ether, **24**, 1038.
 Silicon-ether, **24**, 1038.
 Silicon hexbromide and hexchloride, **25**, 40.
 Silicon, hydrated, **11**, 93.
 Silicon nitride, **11**, 95.
 Silicon oxychlorides, **24**, 1000.
 Silicon oxychlorides, action of heat on the, **25**, 221.
 Silicon subchlorides, **24**, 998.
 Silicon subfluoride, **24**, 999.
 Silicon, boron, and carbon, atomic weights of, **14**, 153.
 Silicon and hydrogen bromide, **11**, 93.
 Silicon and hydrogen chloride, **11**, 91.
 Silicon and hydrogen iodide, **11**, 93.
 Silicopropionic acid, **24**, 918; **25**, 610.
 Silicotriamine, **19**, 255.
 Silk, cleansing of, **25**, 940.
 — dyeing of, with aniline purple, violine, and roseine, **14**, 250.
 — dyeing of, with azuline, **14**, 251.
 — dyeing of, with fuchsine, picric acid, chinoline-blue, and chinoline-violet, **14**, 250.
 — silvering and gilding of, **24**, 450.
 — spontaneously inflammable loaded, **25**, 531.
 — stability of colours fixed on, **25**, 1144.
 — Westphal's process for dyeing black and loading of, **24**, 971.
 Silk and wool, application of coal-tar colours to the dyeing of, **14**, 250.
 Silk, wool, and vegetable fibres in mixed tissues, processes for distinguishing and separating, **25**, 1144.
 Silkworm disease, **24**, 435.
 Silver, absorption of hydrogen by, **20**, 283.
 Silver, action of ammonium sulphhydrate on, **25**, 981.
 — action of, on mercuric ethide, **17**, 36.
 — action of moist ultramarine on, **24**, 970.
 — action of sugar on, **7**, 199.
 — comparative degree of affinity of chlorine, bromine, and iodine for, with some analyses of its native compounds with those elements occurring in Chile, **10**, 234.
 — assay of, **25**, 182.
 — atomicity of, **24**, 529.
 — curious change in the molecular structure of, **11**, 47.
 — influence exerted by, on the luminosity of phosphorus, **11**, 104.
 — note on platinum accompanying, in solution in nitric acid, **7**, 48.
 — method of covering glass, by precipitation, with a coating of metallic, **11**, 128.
 — method of obtaining it pure in the metallic state, or in the form of oxide, **1**, 190.
 — modification of the reactions of, by citric acid, **10**, 114.
 — occurrence of, in fuci, **3**, 70.
 — occurrence of, in plants and animals, **3**, 70.
 — occurrence of, in sea-salt, **3**, 69.
 — occurrence of, in sea-water, **3**, 69.
 — refining of, **24**, 448.
 — reflecting power of, for the chemical rays, **17**, 77.
 — relative absorptive action of various media upon the electric spectrum of, **17**, 76.
 — sensitiveness of haloid salts of, to light, **24**, 302.
 — specific gravity and atomic volume of, **11**, 62, 65.
 — symbol of, in Brodie's chemical calculus, **21**, 449.
 Silver acetate from a photographic silver-bath, **25**, 271.
 — — tartrate, racemate, and malate, table of experiments with, **1**, 24.
 Silver amalgam, **16**, 383.
 Silver anxylophosphate, **9**, 136.
 Silver anchoate, **10**, 169.
 Silver anisoate, **9**, 187.
 Silver apophyllate, **5**, 267.
 Silver arsenite, **15**, 290.
 Silver arsenophosphate, **3**, 148.
 Silver bassiate, **2**, 235.
 Silver benzoglycollate, **5**, 78.
 Silver bibromacetate, **11**, 28; **12**, 4.
 Silver bibromosuccinate, **13**, 104.
 Silver binioacetate, **13**, 4.
 Silver, brittle, **24**, 499.
 Silver bromacetate, **11**, 25.

Silver bromide, **10**, 241.
 ——— compound of, with dibromide of ethylene-hexethyl-diphosphonium, **14**, 102.
 Silver bullion, manipulation of assays of, **23**, 366.
 Silver chloride, action of barium dioxide on, **4**, 203.
 ——— action of light on, **10**, 71.
 ——— blackened by light, action of nitric acid containing lower iodides of nitrogen on, **25**, 455.
 ——— crystallised, **10**, 242.
 ——— degree of solubility of, in strong nitric acid, **25**, 453.
 ——— non-volatility of, at high temperatures, **21**, 507.
 ——— reduction of, in the wet way, **24**, 498.
 ——— solubility of, **25**, 123.
 Silver chloride and iodide, reduction of, by hydrogen, **24**, 1099.
 Silver chlorobromide, **10**, 239.
 ——— specimen of, from Chile, **4**, 149.
 Silver chloromaleate, **13**, 11.
 Silver chromate and mercury cyanide, double salt of, **1**, 24.
 Silver chrysaniate, **3**, 77.
 Silver citrobianilate, **5**, 286.
 Silver citromonanilates, **5**, 387.
 Silver comenat, **11**, 120.
 Silver cyanide, **11**, 92.
 Silver diazo-amidobenzoate, **18**, 301.
 Silver diazo-amidotoluylate, **18**, 316.
 Silver dinitrochlorophenate, **20**, 434.
 Silver, dinitroethylate of, **11**, 87.
 Silver disulphanilate, **9**, 261.
 Silver disulphetholate, **9**, 252.
 Silver disulphometholate, **9**, 245.
 Silver ethonide, **1**, 152.
 Silver ethylcrotonate, **18**, 136.
 Silver ethylomeconate, **6**, 74.
 Silver ethylotrithionate, **10**, 61.
 Silver fluoride, **25**, 790.
 Silver fulminate, explosion of, **23**, 45.
 Silver glyeollate, **5**, 80.
 Silver haloid salts, changes in, produced by light, **24**, 481.
 Silver hydropiperate, **15**, 23.
 Silver insolinate, **9**, 211.
 Silver iodide, **10**, 241.
 ——— crystallised, **10**, 243.
 ——— decomposition of, **24**, 313.
 Silver iodide, bromide, and chloride, refraction and dispersion of light in, **24**, 656.
 Silver lacquer, French, **24**, 868, 969.
 Silver leucate, **14**, 314.
 Silver, melted, specific gravity and atomic volume of, **11**, 78.
 Silver methylodithionate, **10**, 249.

Silver nitrate, action of bromine water on, **15**, 479.
 ——— action of, on cyanide of ethylene, **15**, 137.
 ——— compound of, with caffeine, **111**, 325.
 ——— compound of, with lophine, **9**, 225.
 ——— compound of, with melaniline, **1**, 297.
 ——— decomposition of, by heat, **1**, 189.
 ——— diffusion of, **4**, 96.
 ——— double salt of, with dipyriridine, **22**, 412.
 ——— preparation of, **111**, 159.
 ——— recovery of, from the silver bath, **24**, 500.
 Silver nitrite, action of heat on, **24**, 85.
 Silver nitro-coccusate, **111**, 475.
 Silver nitrotoluylate, **111**, 433.
 Silver oenanthylate, **1**, 3.
 Silver ores, application of sulphur in the roasting of, in the Stetefeldt furnace, **25**, 532.
 ——— Kröncke's method of amalgamating, **24**, 447.
 Silver orthovanadate, **24**, 35.
 Silver oxalate, note on, **22**, 292.
 Silver oxide, action of barium dioxide on, **4**, 206.
 ——— compound of, with urea, **6**, 4.
 ——— some substances which reduce, **11**, 242.
 Silver oxide and nitrate, alkaline-reaction of, **24**, 109.
 Silver platino-bisulphocyanide, **7**, 34.
 Silver platino-ter sulphocyanide, **7**, 28.
 Silver pyrophosphotriaminate, **19**, 4.
 Silver residues, melting of, **24**, 972.
 Silver salt of sulphur-urea, **22**, 10.
 Silver salts, osmose of, **8**, 93.
 Silver selenite, **2**, 67.
 Silver selenocyanate, **4**, 15.
 Silver solutions, dilute, mutual precipitation of, by the chlorides, bromides, and iodides of hydrogen and the alkali-metals, **25**, 25.
 Silver sorbate, **12**, 47.
 Silver sulphanilate, **9**, 260.
 Silver sulphide, specific gravity and atomic volume of, **111**, 89.
 Silver sulphites, **24**, 1169.
 Silver tartranilate, **8**, 181.
 Silver toluylate, **111**, 429.
 Silver treasure trove, chemical changes undergone by some, found at Hildesheim, **24**, 666.
 Silver triacbullylate, **18**, 338.
 Silver tricyanurate, **3**, 87.
 Silver vanadates, **24**, 35.

- Silver and ammonium glyoxylate, **18**, 198.
- Silver and berberine hyposulphite, **15**, 347.
- Silver and copper, natural alloy of, from Chile, **3**, 29.
- — — quick method of separating, **25**, 926.
- — — reciprocal precipitation of, **9**, 290.
- Silver and gold, improved process of extracting, from arseniosulphides of lead, copper, &c., **24**, 417.
- — — Rivot's process for extracting, from their ores, **24**, 1219.
- — — a double sulphide of, **25**, 680.
- Silver and mercury, reciprocal precipitation of, **9**, 289.
- Silver and zinc, thermo-electric properties of, **7**, 309.
- Silvering of gelatin relief-forms for galvanoplastic work, **24**, 767.
- of glass, **24**, 859.
- of silk, **24**, 450.
- Sinapic acid, **6**, 189.
- Sinapine, **6**, 187.
- Sinapirine, **24**, 408.
- Sinapoline, **10**, 324.
- Sincaline, **6**, 189.
- Singing flame, a new sensitive, **25**, 875.
- Siphon, the globe-, **25**, 17.
- Six-carbon ether, **4**, 234.
- Slag from blast-furnace, composition of, **15**, 314.
- Slags of blast-furnaces, estimation of iron in, **25**, 1117.
- Slags from copper-smelting furnaces, examination of, **2**, 220.
- Slags from iron furnaces, **1**, 396.
- Slate, Cornish, **24**, 111.
- Slates, microscopic constitution of, **25**, 294.
- Slates from Nolla in the Grisons, **25**, 991.
- Slow actions continued for a number of years, effects of, **25**, 873.
- Smoke from common fires, ammonia and sulphurous acid contained in, **11**, 232.
- Snakes, chemical relations of the nuclei of the blood-corpuscles in, **24**, 740.
- Snow, normal constituents of, **25**, 324.
- Soap, effect of, in causing distillation to proceed quietly, **22**, 128.
- — — preparation of alcoholic solution of, from water-analysis, **15**, 471.
- — — yellow colouring of, by cadmium sulphide, **24**, 868.
- Soap making, use of sodium silicate (water-glass) in, **25**, 340.
- Soap, soft, **25**, 934.
- Soap, soft, easy determination of fat and alkali in, **24**, 969.
- Soaps, passage of, through membranes, **15**, 416.
- Soap-test, Clark's, action of, on Dec water, **4**, 126.
- — — degree of hardness of the waters supplied by the eight principal London Companies, determined by, **4**, 382.
- Soda, action of bromine on, **15**, 477.
- — — composition and analysis of black ash or ball soda, **11**, 155.
- — — double sulphates containing, **11**, 49.
- — — inconveniences presented by the substitution of, for potash, **25**, 266.
- — — loss of, in the alkali-manufacture, **20**, 107.
- — — loss of, in Leblanc's process, **25**, 335.
- — — remarkable salt deposited from the mother-liquors in the manufacture of, **25**, 660.
- — — separation of, from magnesia, **24**, 955.
- — — separation of magnesia and of the oxides of nickel, cobalt and zinc, from, **2**, 99.
- — — specific gravity and atomic volume of, **11**, 84.
- Soda and potash, distribution of, in plants, **24**, 851 ; **25**, 86.
- — — proportions of, in plants grown under different circumstances, **14**, 215.
- — — variation in the proportion of, present in certain samples of barley grown in plots of ground artificially impregnated with one or other of these alkalis, **5**, 9.
- Soda ash, composition and analysis of, **12**, 2, 217 ; **20**, 409.
- Soda-boric methide, **15**, 380.
- Sodaacetotartric ether, **20**, 147.
- Soda-lime, action of, on papaverine, **8**, 286.
- Soda-salts. See Sodium-salts.
- Soda-waste, composition of, **2**, 218.
- — — determination of sulphides, sulphites, hyposulphites, and sulphates in, as obtained from "black ash," **11**, 166.
- Sodio-calcic felspars, chemical composition of, **25**, 288.
- — — general formula of, **25**, 51.
- Sodioferrous sulphate, **25**, 1078.
- Sodiotartaric ether, **20**, 155.
- Sodium, action of, on iodide of ethyl, in presence of acetic ether, **16**, 418.
- — — action of, on mercuric ethyl, **16**, 20.

Sodium, action of, upon iodide of methyl mixed with ether, **13**, 140.
 — action of, on iodide of methyl, in presence of acetic ether, **16**, 416.
 — action of, on a mixture of phosphene-ether and ethyl iodide, **25**, 607.
 — action of, on oxalic ether, **22**, 441.
 — action of, on peppermint camphor, **15**, 28.
 — action of, on valerianate of ethyl, **17**, 371.
 — action of, on the two isomeric mono-bromotoluenes, **24**, 684.
 — atomicity of, **22**, 199.
 — decomposition of minerals by, **24**, 1210.
 — oxidation of, **14**, 276.
 — reaction of, with nitrate of amyl, **20**, 583.
 — reaction of, with nitrate of ethyl, **20**, 584.
 — reaction of, with nitrate of methyl, **20**, 585.
 — reaction of, with nitrite of amyl, **20**, 580.
 — solubility of, in liquid ammonia, **24**, 309.
 — specific gravity and atomic volume of, **11**, 63.
 — spectrum produced by, **13**, 275.
 — uses of, **24**, 868.
 Sodium acetate, compounds of, with water, **24**, 230.
 Sodium acetoxybenzamat, **13**, 240.
 Sodium alcoholate, action of, on benzoic ether, **25**, 244.
 Sodium amalgam, **24**, 890
 — action of, on an alcoholic solution of ethylic oxalate, **25**, 365.
 — action of, on iodide of amyl in presence of acetic ether, **16**, 420.
 — action of, on oxalic ether, **24**, 820, 908.
 Sodium amidobenzoate, **9**, 269.
 Sodium amylate, reaction of, with nitrate of methyl, **20**, 585.
 Sodium anisoate, **9**, 186.
 Sodium antimonate, **25**, 41.
 Sodium bassiate, **2**, 235.
 Sodium benzoglycolate, **5**, 77.
 Sodium bibromosuccinate, **13**, 104.
 Sodium bicarbonate, diffusion of, **4**, 103.
 Sodium biomenate, **4**, 365.
 Sodium binoxide, action of carbonic acid on, **14**, 284.
 — action of carbonic oxide on, **14**, 283.
 — action of nitric oxide on, **14**, 287.

Sodium binoxide, action of nitrogen protoxide on, **14**, 285.
 — hydrate of, **14**, 279.
 Sodium bistearate in human excrements, **10**, 164.
 Sodium bisulphate, **1**, 121.
 Sodium bisulphite, **11**, 293.
 — compound of, with glyoxylic acid, **18**, 193.
 — compound of, with hydride of ethyl-salicyl, **20**, 423.
 — compound of, with hydride of methyl-salicyl, **20**, 420.
 Sodium bromacetate, **11**, 23.
 Sodium bromide, compound of, with dextroglucose, **16**, 297.
 — diffusion of, **4**, 100.
 Sodium bromocoumarilate, **24**, 49.
 Sodium cadmio-chloride, **1**, 105.
 Sodium carbonate, action of boracic acid on, at a bright red heat, **12**, 186.
 — action of boracic acid on, at a dull red heat, **12**, 181.
 — action of boracic acid on, at 212° F., **12**, 179.
 — precipitation of, by calcium chloride, **23**, 359.
 — preparation of, **11**, 159.
 — products of the distillation of sal-ammoniac with, **23**, 260.
 — strength of solutions of, of different specific gravities, **11**, 181.
 — volumes occupied by, **11**, 418.
 Sodium chloride, abnormal crystals of, **24**, 1178.
 — aqueous, density and expansibility of, **24**, 1127.
 — determination of, in urine, **6**, 1.
 — diffusion of, **4**, 96; **15**, 222, 225, 227, 230, 231, 232, 234, 236.
 — diffusion of mixtures of, with the sulphates of sodium and potassium, **15**, 231, 232, 234, 236.
 — effect of, on the crystallisation of sugar, **22**, 124.
 — effect of, on the solution of carbonic acid in water, **23**, 38.
 — formation of transparent cubes of, **24**, 311.
 — hydrated, from Etna, **24**, 1173.
 — osmose of, **8**, 69.
 — precipitate from acetate of alumina with, **6**, 231.
 — saccharate of, **24**, 572.
 — solution, supersaturation of, **25**, 281.
 — specific heat, density, and expansion of, **24**, 95.
 Sodium coumarilate, **24**, 47.

- Sodium, crystallised, **13**, 122.
 Sodium diazo-amidoanisate, **18**, 313.
 Sodium diazo-amidobenzoate, **18**, 301.
 Sodium diazo-amidotoluate, **18**, 316.
 Sodium dinitroethylate, **11**, 87.
 Sodium dinitromethylate, **11**, 89.
 Sodium-dithyl, formation of, **13**, 191.
 ———— formation of propionic acid
 by the action of carbonic acid on,
 11, 103.
 ———— action of mercury in con-
 junction with other metals on, **19**,
 129.
 ———— action of carbonic oxide on,
 19, 13.
 ———— preparation of, **11**, 103.
 ———— properties of, **13**, 193.
 ———— and carbonic oxide, oxidation-
 products of the propione produced
 from, **19**, 326.
 Sodium ethylate, action of, on oxalic
 ether, **22**, 442.
 ———— deportment of ethyl cyanate
 with, **13**, 70.
 ———— absolute, **22**, 200, 442.
 Sodium ethylotrithionate, **10**, 63.
 Sodium gaultherate, action of benzyl
 chloride on, **21**, 124.
 Sodium hydrate, action of boracic acid
 on, at a red heat, **14**, 147.
 ———— action of silicic acid on, at
 a red heat, **14**, 150.
 ———— action of a solution of, on a
 stoneware jar, **III**, 315.
 ———— crystallisation of, **25**, 597.
 ———— os nose of, **8**, 73.
 Sodium hydrosulphate, compound of,
 with mustard oil, **8**, 185.
 ———— action of, on sulphide of gold,
 1, 243.
 Sodium hyposulphite, **23**, 426.
 ———— solvent power exercised by a
 solution of, on many salts insoluble in
 water, **16**, 28.
 Sodium iodide, diffusion of, **4**, 100.
 Sodium leucate, **14**, 310.
 Sodium line, reversal of, **24**, 185.
 Sodium metaphosphate, **III**, 280.
 Sodium metasilicate, a new, **25**, 672.
 Sodium methylate, reaction of, with
 nitrate of amyl, **20**, 583.
 Sodium nitrate, diffusion of, **4**, 96.
 Sodium nitrate and caespar, isomorphism
 of, **24**, 197.
 Sodium nitrotoluate, **III**, 437.
 Sodium orthovanadate, **24**, 29.
 Sodium peroxide, analysis of, **14**, 277.
 ———— preparation of, **14**, 276.
 Sodium phosphate containing different
 quantities of water of crystallisation,
 amount of heat evolved or absorbed in
 the solution of, **24**, 1131.
 Sodium phosphate, estimation of mag-
 nesia by, **1**, 186.
 Sodium platino-tersulphocyanide, **7**,
 32.
 Sodium pyrovanadate, **24**, 31.
 Sodium quadriselenite, **2**, 58.
 Sodium-salicyl hydride, action of benzyl
 chloride on, **21**, 122.
 ———— action of ethyl iodide
 on, **20**, 422.
 ———— action of methyl iodide
 on, **20**, 418.
 Sodium-saligenin, reaction of, with acetyl-
 glucose, **25**, 70.
 Sodium salts, compounds of, with cane-
 sugar, **24**, 270.
 ———— specific heat, density, and ex-
 pansion of aqueous, **24**, 95, 1126.
 Sodium selenocyanate, **4**, 19.
 Sodium silicate, use of, in soap-making,
 25, 340.
 Sodium sulphantimonate, **25**, 41.
 Sodium sulphantimonate and hyposul-
 phite, compound of, **25**, 42.
 Sodium sulphate, **I**, 118.
 ———— action of low temperatures
 on the so-called supersaturated solu-
 tions of, **25**, 465
 ———— and the chlorides of potassium
 and sodium, diffusion of mixtures of,
 15, 232, 234.
 Sodium sulphide as a blowpipe reagent,
 25, 524.
 ———— reactions of antimony-com-
 pounds with, **25**, 42.
 Sodium sulphite, **III**, 292.
 Sodium sulphocoumarilate, **24**, 59.
 Sodium sulphopalladate, **24**, 313.
 Sodium sulphoximate, **25**, 853.
 Sodium toluate, **III**, 431.
 Sodium tricarballoylates, **18**, 337.
 Sodium vanadates, **24**, 29.
 Sodium and amylic iodide, action of,
 upon acetic ether, **19**, 418.
 Sodium and cadmium chloride, **8**, 254.
 Sodium and cadmium sulphate, **8**, 257.
 Sodium and didymium sulphate, **6**,
 271.
 Sodium and ethylic oxide, action of, upon
 acetic ether, **19**, 396.
 Sodium and glycerin, compound of,
 25, 450.
 Sodium and isopropylic iodide, action of,
 upon acetic ether, **20**, 102.
 Sodium and lithium, separation of,
 25, 468.
 Sodium and methylic iodide, action of,
 upon acetic ether, **19**, 411.
 Sodium phosphate and carbonate, osmose
 of, **8**, 77.
 Sodium and potassium, action of arse-
 nious acid on the carbonates of, at

- 212° F., and at a low red heat, **15**, 281, 287.
- Sodium and potassium, auro-sulphides of, **1**, 236.
- — — — — determination of the solubilities and specific gravities of certain salts of, **25**, 566.
- — — — — diffusion of a mixture of chlorides of, **15**, 230.
- — — — — osmose of sulphates of, **8**, 80.
- — — — — peroxides of, **14**, 267.
- — — — — separation of, **25**, 175.
- Sodium and potassium insolate, **9**, 214.
- Sodium and potassium sulphate, **6**, 106.
- Sodium and zinc sulphate, crystalline form of, **11**, 391.
- Soft water, action of, on lead, **4**, 401.
- Soil analyses, real value of, **24**, 276.
- Soil, humus-substances of, **25**, 521.
- — — — — influence of marl on the formation of carbonic acid and nitric acid in, **24**, 751.
- — — — — influence of the temperature of the, on the development of certain plants, **25**, 167.
- — — — — nitrous acid in, **24**, 852.
- — — — — transformation of nitrous acid in, **25**, 319.
- — — — — reclaimed from the Haarlem Lake in Holland, composition of, **24**, 280.
- Soil statics and soil analyses, **25**, 318, 837.
- Soil, surface-, analysis of, from the Desert of Atacama, **7**, 308.
- Soil of Tintah (Lower Egypt), composition of the, **25**, 465.
- Soil and soil-constituents, water-holding power of, **25**, 522.
- Soils, absorption of gases by, **24**, 853.
- — — — — condition of phosphoric acid in, **25**, 838.
- — — — — influence of vegetal mould on the porosity of, **25**, 839.
- — — — — part taken by oxide of iron and alumina in the absorptive action of, **21**, 1.
- — — — — productive power of, in relation to loss of plant-food by drainage, **24**, 276.
- — — — — properties of, **11**, 53.
- — — — — relation between absorption, weathering, and fertility of, **25**, 613.
- — — — — retention of potash and phosphoric acid by, **24**, 293.
- — — — — solvent action of drainage-water on, **11**, 219.
- Soils on which flax had been grown, analysis of, **2**, 78.
- Soils containing titanio acid, from West Indian islands, analyses of, **15**, 323.
- Solar atmosphere, chemical analysis of, **13**, 287.
- Solar rays, heat disengaged by the chemical action of the, **6**, 259.
- — — — — influence of, on precipitation, **11**, 312.
- Solfatara of Puzzuoli, composition of the gases evolved from the, **25**, 294.
- Solfataras, gases of, **25**, 469.
- Solid constituents, estimation of total, in potable waters, **21**, 78, 87.
- Solid nuclei, effect of, in causing the liberation of gases and solids from liquids, **22**, 126, 127, 136, 144, 150.
- Solidifying temperatures of saline solutions, **25**, 1062.
- Solids, diastinic power of, **17**, 64.
- Solids, heat of expansion of, **25**, 780.
- Solubilities and specific gravities of certain salts of sodium and potassium, **25**, 566.
- Solution, change of volume accompanying, **25**, 217.
- — — — — influence of, on circular polarisation, **13**, 261.
- — — — — state of substances in, **25**, 212.
- Solution and mixture, influence of, on the specific refractive energy of elements and their compounds, **18**, 110.
- Solutions, action of low temperatures on the so-called supersaturated, of sodium sulphate, **25**, 465.
- — — — — application of circular polarisation to the determination of what is going forward in, **13**, 268.
- — — — — density and expansibility of some, **24**, 1125.
- Solutions, aqueous, of acids and alkalis, constitution of, **11**, 155.
- — — — — heat evolved in formation of, **24**, 475.
- — — — — specific gravities of, **25**, 975.
- Solutions, saline, densities of, **24**, 987.
- — — — — a relation between density and capillary action in, **25**, 212.
- — — — — freezing of, **25**, 781.
- — — — — specific heat of, **24**, 468.
- — — — — solidifying temperatures of, **25**, 1062.
- — — — — supersaturation of, **3**, 164.
- Solutions in sulphide of carbon, specific of, **24**, 96.
- Solutions, super-saturated, **22**, 129.
- — — — — behaviour of, when exposed to the open air, **25**, 218.
- Solvents, acid, action of, and reciprocal decomposition in alcohol, **15**, 307.
- Solvents, laws which regulate the distribution of a substance between two, **25**, 783.
- Sombrenite, **15**, 277.
- Sonorousness of alloys, **20**, 214.
- Sorbamide, **14**, 50.

- Sorbate of barium, **12**, 47.
 Sorbate of calcium, **12**, 48.
 Sorbate of silver, **12**, 47.
 Sorbic acid, **5**, 283 ; **12**, 46 ; **25**, 486.
 Sorbie ether, **12**, 50.
 Sorbin, a saccharine substance extracted from the berries of the mountain-ash, **5**, 281.
 Sorbite, a saccharine matter analogous to mannite in the juice of mountain-ash berries, **24**, 103 ; **25**, 480.
 Sorbyl chloride, **12**, 50.
 Sparteine, **15**, 1.
 ——— action of ethyl iodide on, **15**, 5.
 ——— preparation and properties of, **4**, 218.
 Sparteine salts, **15**, 3.
 Sparteine and zinc chloride, **15**, 5.
 Sparteine and zinc iodide, **15**, 4.
Spartium scoparium, examination of, **4**, 216.
 Specific gravities, errors which arise in the determination of, when the bodies are weighed in a highly divided state, **1**, 182.
 ——— instrument for determining, **2**, 224.
 ——— lecture apparatus for, **24**, 482.
 ——— of alloys, **20**, 204.
 ——— of the alloys of tin and lead, **15**, 31.
 ——— of aqueous solutions, **25**, 975.
 Specific gravities and solubilities of certain salts of sodium and potassium, **25**, 566.
 Specific gravity, average, of heterogeneous liquids, determination of, **19**, 456.
 ——— influence of a change of, on the melting point, **25**, 460.
 ——— of isomeric modifications of stearin, **5**, 207.
 ——— of urine as a measure of its solid constituents, **16**, 25.
 ——— of various vegetable infusions, **9**, 39.
 Specific gravity and atomic volume, researches on, **III**, 57, 199 ; **1**, 121.
 ——— table of, **1**, 137.
 Specific heat of solid bodies, **19**, 154.
 ——— of alloys, **20**, 205.
 ——— of aqueous solutions, **24**, 798.
 ——— of carbon, **25**, 592.
 ——— of liquids, **24**, 94.
 ——— of saline solutions, **24**, 468.
 Spectra of absorption. See Absorption Spectra.
 ——— of alloys, **17**, 82.
 ——— of bodies belonging to the nitrogen and chlorine groups, **24**, 1144.
 Spectra of carbon, boron, silicon, titanium, and zirconium, **24**, 1147.
 ——— of chlorophyll, **25**, 158, 160.
 ——— of coal-tar colours, **14**, 254.
 ——— of incandescent gases, **24**, 483.
 ——— of metallic vapours, reversal of the lines in, **24**, 1142.
 ——— of phosphorus and of compounds of silicon, **25**, 27.
 ——— photographic effects of metallic and other, obtained by means of the electric spark, **17**, 59.
 ——— of simple gases, **24**, 991.
 ——— of sulphur, selenium, and tellurium, **24**, 1145, 1146.
 ——— of tin and its compounds, **24**, 1147.
 ——— of Uranus and of Comet I, 1871 note on, **24**, 885.
 Spectroscope, coloured gelatin-films as objects for the, **25**, 118.
 ——— use of, for the quantitative estimation of colouring matters, **24**, 602.
 Spectroscopic characters of the ammoniacal solutions of carmine, cochineal, and other substances, **24**, 1096.
 Spectroscopic observation of the sun, **24**, 798.
 Spectroscopic phenomena produced by dispersion, **24**, 798.
 Spectroscopic researches on the sun, **25**, 1071.
 Spectrum, distribution of heat in the, **25**, 968.
 ——— influence of pressure on the lines of the, **25**, 664.
 Spectrum of the aurora borealis, **25**, 119, 1061.
 Spectrum of barium, **13**, 284.
 ——— of calcium, **13**, 281 ; **24**, 1149.
 ——— of carbon, **16**, 97.
 ——— of carbon, electric, relative absorptive action of various media upon the, **17**, 76.
 ——— of fluorescent light, **25**, 1058.
 ——— of incandescent gas, mode of reversing, **13**, 287.
 ——— of lightning, **25**, 118.
 ——— of lithium, **13**, 276.
 ——— of potassium, **13**, 278.
 ——— of sodium, **13**, 275.
 ——— of thallium, **17**, 134.
 ——— of the vapour of water, **25**, 280.
 Spectrum analysis applied to the quantitative estimation of colouring matters, **24**, 759.
 ——— discovery of a new alkali-metal by, **13**, 287.
 ——— new method of, **25**, 1113.
 ——— on some points of, **25**, 117.

- Spectrum analysis, use of a reflector in, **24**, 857.
- Spectrum colours, influence of, on the decomposition of carbon dioxide by plants, **25**, 1107.
- Spectrum lines, shifting of, by the action of temperature on the prisms, **25**, 118.
- Spectrum observations, chemical analysis by, **13**, 270.
- Speculative ideas (Graham's) respecting the constitution of matter, **17**, 368.
- Speculum metal, its reflecting power for the chemical rays, **17**, 77.
- Spermaceti, saponification of, by caustic potash, **5**, 84.
- Sphalerite, occurrence of thallium in, **24**, 312.
- Spiegeleisen, estimation of manganese in, **24**, 756.
- Spirit, detection of, in essential oils, **25**, 265.
- Spirit of wine free from duty, for use in the arts and manufactures, report on, **8**, 120.
- Spirit-colouring, manufacture of starch-sugar free from gum, for the preparation of, **25**, 938.
- Spiritus ammoniac aromaticus*, **23**, 261.
- Spleen, question as to the existence of glycogen in the, **25**, 84.
- Spongy platinum, specific gravity of, **111**, 69.
- Sprengel mercurial pump, application of the, to the analysis of coke, **25**, 321.
- — — application of, to the estimation of carbon in iron and steel, **25**, 924.
- Spring, boiling, in New Zealand, composition of, **15**, 57.
- Spring-period of birch and maple, **25**, 170.
- Springs, dolomitic, of the Franconian Jurassic formation, **25**, 59.
- Stannethylum, **6**, 62.
- Stannamylum, **6**, 62.
- Stannates of the alkalis, preparation of pure, **25**, 1075.
- Stannethyliums, **6**, 59, 60.
- Stannic acid crystallised from borax, **24**, 804.
- Stannic acid, liquid, **17**, 325.
- Stannic chloride, spectrum of, **24**, 1148.
- Stannic compounds crystallised from fluxes, **25**, 121.
- Stannic diethyl, action of bichloride of titanium on, **16**, 23.
- Stannic diethyl, its action on metallic salts, **16**, 22.
- Stannic organo-compounds, formation of, **13**, 182.
- Stannic organo-compounds, properties of, **13**, 200.
- Stannic oxide, action of acetic anhydride on, **25**, 813.
- Stannic oxide, action of phosphorous chloride on, **25**, 223.
- Stannic phenyl-triethide, **24**, 225.
- Stannic sulphide, hydrated **24**, 957.
- Stannic triethide, reactions of, **24**, 223.
- Stannous ethide and methide, **13**, 182.
- Stannous organo-compounds, formation of, **13**, 182.
- — — properties of, **13**, 199.
- Starch, **24**, 543.
- — — action of acids on, **25**, 581.
- — — action of aniline on, **25**, 150.
- — — action of dilute sulphuric acid in, **24**, 226.
- — — action of malt-extract on, **25**, 380.
- — — behaviour of, to iodine and tannic acid, **25**, 72.
- — — bye-products of the manufacture of, **25**, 1136.
- — — proportion of, in various sorts of potatoes, **25**, 1111.
- — — reaction of, with acetic anhydride, **25**, 67.
- — — in the testicles, **25**, 256.
- — — transformation-products of, **25**, 579.
- Starch, animal, **24**, 838.
- Starch, iodised, **25**, 299, 687.
- — — reaction of, with tannic acid, **25**, 73.
- Starch-paper soaked in iodide of potassium, as a test for ozone, **20**, 1.
- Starch-sickness of plants grown without potash, **25**, 166.
- Starch-sugar free from gum, manufacture of, for the preparation of spirit-colouring, **25**, 938.
- Starch-syrup and starch-sugar, manufacture of, **24**, 458.
- Stassfurtite, relation of, to boracite, **25**, 125.
- Steam-boiler explosions, **25**, 337.
- Steam-boilers, experiments on the danger arising from the use of certain waters, for feeding, **15**, 32.
- Steam, of low pressure, power of, in charring animal and vegetable matter, **1**, 41.
- Stearate of calcium, products of decomposition of, **8**, 308.
- Stearic acid, compounds of glycerin with, **6**, 282.
- — — in human excrements, **10**, 163.
- — — recovery of, from oleic acid, **24**, 972.
- — — solid compound obtained by distilling, with lime, **6**, 97.

- Stearic ether, **5**, 312.
 Stearin, **6**, 282.
 — action of the alkaline ethylates on, **5**, 311.
 — analysis of, **1**, 231.
 — composition of, **2**, 363.
 — constitution of, **5**, 84, 303.
 — melting points of, **5**, 200, 205.
 — specific gravity of isomeric modifications of, **5**, 207.
 — various modes of purification of, by crystallisation from ether, **5**, 199.
 Stearone, **8**, 308.
 Stearophanin in human fat, **5**, 85.
 Stearoptene of *Ptychotis Ajwan*, **9**, 235.
 Steel, alleged action of cold in rendering, brittle, **24**, 444.
 — condition of carbon and silicon in, **24**, 106.
 — dry process for the estimation of silicon in, **24**, 1212.
 — effects of phosphorus on the malleable qualities of, **22**, 81.
 — effects of various elements on the properties of, **21**, 282.
 — estimation of manganese in, **25**, 925.
 — existence of nitrogen in, **17**, 390.
 — methods for the determination of carbon in, **23**, 375.
 — nature of, **22**, 280.
 — its power of retaining magnetism increased by the presence of tungsten, **21**, 284.
 — proportion of carbon in various kinds of, **21**, 281.
 — its reflecting power for the chemical rays, **17**, 77.
 — on the regenerative gas-furnace as applied to the manufacture of cast, **21**, 279.
 — reports on recent patents connected with the manufacture of, **10**, 125.
 — silicon and manganese in, **25**, 1136.
 — various processes for the making, **21**, 284.
 Steel, Bessemer and crucible-cast, **25**, 1144.
 Steel, burnt, **24**, 791.
 Steel, cast, combination of the Bessemer and Martin processes for the manufacture of, **24**, 604.
 Steel and iron, manufacture of, **25**, 533.
 Steel and iron, remarks on the use of titaniferous minerals in the manufacture of, **16**, 387.
 Steel ore of Pennsylvania, **25**, 59.
 Stereochromic pictures, painting-ground for, **24**, 1222.
 Stereoscopic pictures, preparation of transparent, on paper, **25**, 947.
 Stibamyl, **5**, 71.
 Stibanyls, **9**, 282.
 Stibbiamyl, **9**, 285.
 Stibethyl, **5**, 69.
 — action of, upon iodide of stibethyl, **9**, 278.
 — compounds of, **9**, 278.
 — salts of, **5**, 69, 70.
 Stibethyls and stibmethylys, **13**, 115.
 Stibethylum, **5**, 71.
 — compounds, **8**, 260—263.
 Stibides, metal-, **12**, 92.
 Stibines and arsines not acted upon by bisulphide of carbon, **13**, 369.
 — — behaviour of, with the sulphocyanates of phenyl and allyl, **13**, 321.
 Stibmethyl, **5**, 67.
 Stibmethylum, **5**, 67.
 Stibmethylum, salts of, **5**, 67.
 Stibtriamyl, **9**, 282.
 Stibtriethyl compounds, **9**, 279—281.
 Stilbene, formation of benzoic acid and aldehyde, by oxidation of, **25**, 63.
Stillingia sebifera, tallow from, **8**, 1.
 Stomach, its power of converting neutral fats into fatty acids, **15**, 415.
 Straw, application of, to paper-making, **24**, 768.
 — manuring with, **25**, 1112.
 Street-gutters, disinfection of, **24**, 971.
 Striped muscular fibre, condition of the doubly refractive substance of, **24**, 735.
 Strontia, existence of, in the well-waters of Bristol, **5**, 193.
 — heat disengaged in the combination of acids with, **6**, 247.
 — prevention of the precipitation of, by citric acid, **10**, 112.
 — in the soil, effect of, on barley and turnips, **14**, 227.
 — specific gravity and atomic volume of, **11**, 84.
 Strontium, specific gravity and atomic volume of, **11**, 63.
 — spectrum produced by, **13**, 279.
 Strontium amidobenzoate, **9**, 269.
 Strontium chloride, diffusion of, **4**, 92.
 — — osmose of, **8**, 85.
 — — preparation of, **8**, 107.
 Strontium cobalticyanides, **24**, 390.
 Strontium comenates, **4**, 367.
 Strontium hydrate, crystallised, **13**, 48.
 Strontium hyposulphite, **23**, 428.
 Strontium malate, **1**, 34.
 Strontium metaphosphate, **11**, 279.
 Strontium nitrate, appearance of flashes of light observed during the crystallization of, **1**, 5 (p).
 — — diffusion of, **4**, 90.

- Strontium nitrotoluate, III, 437.
 Strontium oenanthylate, I, 5.
 Strontium oxalate, acid, 5, 224.
 Strontium peroxide, preparation of, 25, 880.
 Strontium phosphite, 20, 361.
 Strontium pyromecconate, 6, 79.
 Strontium selenite, 2, 60.
 Strontium selenocyanide, 4, 19.
 Strontium sulphoconmarilate, 24, 52.
 Strontium and barium carbonates, action of boracic acid on, 12, 188, 190.
 Struvite, III, 106.
 Strychnine, alleged adulteration of pale ales by, 5, 173.
 — base obtained from, 25, 79.
 — ceroso-eric acid as a test for, 25, 845.
 — compound of, with iodide of mercury, 11, 100.
 — oxidation of, 21, 164.
 — test for, 5, 170.
 Strychnine bases, periodides of, 24, 398.
 Strychnine hydrochloride, diffusion of, 4, 104.
 Strychnine oxethyl-compounds, 24, 148.
 Strychnine phosphates, 1, 55.
 Strychnine salts, 2, 241—261.
 Strychnine and morphine, determination of, in presence of one another, 24, 443.
 Stubble and roots remaining in the field after harvest, quantity and composition of, 25, 262.
 Stuffs, note on the stability of colours fixed on, 25, 1144.
 Styphnic acid, 24, 227.
 — action of chloride of iodine on, 20, 435.
 — action of chlorine on, 19, 237.
 — a new derivative of, 25, 894.⁵
 Styrol, II, 331, 353.
 — action of bromine on, II, 345.
 — action of chlorine on, II, 346.
 — action of chromic acid on, II, 344.
 — action of fuming sulphuric acid on, II, 345.
 — action of heat on, II, 347.
 — action of nitric acid on, II, 339.
 — preparation of, II, 336.
 Styrolene, 25, 410.
 Subchlorides of silicon, 24, 998.
 Suberic acid, action of caustic baryta on, 17, 260.
 — a product of the action of nitric acid on Chinese wax, 10, 174.
 Subfluoride of silicon, 24, 999.
 Sublimation, modification of the ordinary process of, in a straight tube, 5, 141.
 Submarine charges, firing of, with magneto-electric apparatus, 14, 193.
 Submaxillary glands, mucin of, 24, 949.
 Suboxide of copper, hydrated: its solubility in aqueous hyposulphite of soda, 16, 29.
 Subphosphide of copper, use of, as a primary composition for igniting charges of gunpowder by electricity, 14, 184.
 Subplatino-tersulphocyanide of mercury, 7, 26.
 Subsals of copper, constitution of, 1, 221.
 Subsals, examination of, II, 460.
 Subsals, volumes occupied by, II, 466.
 Substitution and chemical combination, influence of, on circular polarisation, 13, 262.
 Substitution, chemical, in plants, 24, 428.
 Substitution, mutual, of some metalloïds, 25, 120.
 Substitution-compounds obtained by the action of nitric acid on cotton, 7, 201.
 Subsulphide of palladium, 24, 315.
 Succinamide, 25, 497.
 Succinate of methyl-salicyl, 7, 61.
 Succinic acid, conversion of, into the corresponding diatomic alcohol, 24, 810.
 — conversion of, into malic acid, 2, 95.
 — decomposition of, by nascent hydrogen, 16, 304.
 — formation of, 17, 109.
 — formation of, by the action of potash on cyanide of ethylene, 15, 136.
 — formation of, by oxidation of butyric acid, 3, 186.
 — occurrence of, in the urine of men and dogs, 25, 257.
 — relations between the amides and anilides of, 25, 496.
 — synthesis of, 15, 134.
 — transformations of citric, butyric, and valerianic acids, with reference to the artificial production of, 15, 111.
 Succinyl-benzamic acid, 25, 1097.
 Succinyl-benzoïn, 25, 1094.
 Succinyl chloride, action of, on tartaric ether, 20, 143.
 Suerate of calcium, dialysis of, 15, 254.
 Suerate of copper, dialysis of, 15, 253.
 Suerate, ferric, dialysis of, 15, 253.
 "Suerate of hydrocarbonate of lime,"

- applied to the purification of cane-juice, **24**, 170.
- Sucrate, uranic, dialysis of, **15**, 254.
- Sugar, action of basic and neutral acetate of lead on solutions of, **14**, 29.
- action of chlorine on solutions of, **14**, 31.
- action of water and heat, or of heat alone, upon, **25**, 812.
- amount of, in hops, **25**, 1111.
- bye-products of the manufacture of, **25**, 1136.
- compounds of, with lime, **25**, 810.
- corrosive action of, on iron and other metals, **7**, 195.
- decolorization of, by ozone, **22**, 124.
- density and expansibility of aqueous solution of, **24**, 1127.
- detection of, by Lehmann's process, **14**, 23.
- detection of, when added to healthy urine, **14**, 22.
- detection of, in healthy urine, by Brücke's lead process, **14**, 37.
- detection of, in healthy urine, by Brücke's alcohol process, **14**, 36.
- difference between lactic acid produced in the fermentation of, and that contained in the juices of flesh, **1**, 400.
- diffusion of, **15**, 222, 226.
- estimation of, **25**, 329.
- estimation of, by Fehling's solution, remarks on, **25**, 928.
- examination of, after treatment with sulphurous acid, **24**, 762.
- fermentation-test of, **14**, 24.
- method of determining a minimum amount of, in the urine, **25**, 636.
- method of separating oxide of iron from raw, **25**, 530.
- organic base from, **25**, 691.
- osmose of, **8**, 63.
- Pettenkofer's test for, **14**, 31.
- precipitation of colouring-matter of, by a metallic oxide, **3**, 55.
- quantity of, in chicory and other sweet roots, **9**, 42.
- quantity of, in coffee, **9**, 41.
- quantity of, in various seeds, **9**, 42.
- recovery of, from molasses by baryta, **25**, 185.
- solubility of, in mixtures of alcohol and water of various strengths and at different temperatures, **25**, 607.
- specific heat, density and expansion of, **24**, 96.
- strength of aqueous solutions of, of different specific gravities, **111**, 196.
- Trommer's test for, **14**, 32.
- Sugar, two new acids from the oxidation of, **25**, 812.
- Sugar of beet-root, presence of common salt in, **22**, 124.
- Sugar (cane-), estimation of, by circular polarisation, **13**, 166.
- — influence of certain salts on the crystallising power of, **24**, 457.
- Sugar of the Eucalyptus, **1**, 159.
- Sugar, raw, centrifugalising of, **24**, 458.
- — solution of, **22**, 104.
- Sugar in urine, **14**, 22.
- — is it a normal constituent? **25**, 634.
- — detection of, by Brücke's and Trommer's processes, **14**, 32.
- — estimation of, **14**, 40; **24**, 1095.
- Sugar in healthy urine, detection of, **14**, 35.
- — estimation of, **14**, 40.
- — proof of its presence by the fermentation-test, **14**, 39.
- Sugar and acid, changes in the proportion of, in grapes during the process of ripening, **20**, 378.
- Sugar and copper, process for the volumetric estimation of, **25**, 1121.
- Sugar-beet, experiments on, **25**, 518.
- Sugar-beets and beetroot distillation, **24**, 433.
- Sugar-colours for beer, &c., from potato-starch sugar, **25**, 938.
- Sugar-factory, effect of certain methods of boiling in the vacuum-pan of a, **25**, 1136.
- Sugar-fermentencies, analysis of, **3**, 367.
- Sugar-making, action of bone-charcoal in, **25**, 529, 937.
- Sugar-refining, chemistry of, **22**, 100.
- Sugar-solutions, action of mould and pus on, **23**, 391.
- — electrolysis of, **25**, 578.
- — purification of, for optical saccharometry, **25**, 927.
- — use of animal charcoal for the decoloration of, in polarimetric analysis, **24**, 763.
- Sugars, reactions of, with acetic anhydride, **25**, 69, 70.
- Sugars containing glucose, examination of, **24**, 91.
- Sugars, raw, analysis of, **22**, 104.
- Sulphacetates of ammonium and barium, **9**, 247.
- Sulphaldehyde and aldehyde, compound of, **24**, 387.
- Sulphallic acid, **10**, 321.
- Sulphanilates, **9**, 260.
- Sulphanilic acid, **9**, 260; **24**, 377, 825.

- Sulphanisate of barium, **10**, 214.
 Sulphanisate of lead, **10**, 212.
 Sulphanisic acid, **10**, 214.
 Sulphanisulide, **3**, 78.
 Sulphanthraquinonic acid, **23**, 138.
 Sulphantimonate of sodium, **25**, 41.
 Sulphantimonate and hyposulphite of sodium, compound of, **25**, 42.
 Sulphate of aluminium, bibasic, **6**, 229.
 Sulphate of aluminium, diffusion of, **4**, 95.
 Sulphate of aluminium, from Iquique in Peru, **22**, 259.
 Sulphate of ammonium, absorption of, by alumina, **21**, 13.
 Sulphate of ammonium, absorption of, by ferric oxide, **21**, 12.
 Sulphate, ammonio-ferrous, amount of combined water in, **25**, 1079.
 Sulphate of arsenethylium, **7**, 263.
 Sulphate of barium, retardation of the precipitation of, in presence of nitric acid and of ammonium nitrate, **25**, 1113.
 ——— solubility of, in hydrochloric acid, **9**, 15.
 Sulphate of biamidobenzoic acid, **9**, 272.
 Sulphate of calcium, solubility of, in aqueous hyposulphite of sodium, **16**, 29.
 Sulphate of chlorocodaine, **4**, 119.
 Sulphate of cinchonine, oxidation of, **21**, 165.
 Sulphate of codeine, **4**, 113.
 Sulphate of didymium, **6**, 269.
 ——— of didymium and ammonium, **6**, 270.
 ——— of didymium and sodium, **6**, 271.
 Sulphate of dipyrindine, **22**, 411.
 Sulphate of ethylene-hexethyl-diphosphonium, **14**, 99.
 Sulphate, ferrous, double salts of, **25**, 1078.
 ——— precipitated by alcohol, amount of combined water in, **25**, 225.
 Sulphate, hydrated cupric-aluminic, from Cornwall, **19**, 130.
 Sulphate of io-iodochinidine, **11**, 143.
 Sulphate of io-iodocinchonine, **11**, 151.
 Sulphate of iodo-quinidine, **11**, 149.
 Sulphate of iodo-quinine, **5**, 177; **11**, 130.
 Sulphate of lead, black amorphous, from Chile, **14**, 156.
 ——— effect of heating, in hydrogen and carbonic oxide, **16**, 42.
 ——— solubility of, in aqueous hyposulphite of soda, **16**, 29.
 Sulphate of lead, solubility of, in hydrochloric and nitric acids, **15**, 59.
 Sulphate of lophine, **9**, 223.
 Sulphate of magnesium, diffusion of, **4**, 94.
 ——— heat evolved in the hydration of, **1**, 111.
 Sulphate of menaphthylamine, **9**, 11.
 Sulphate of methyl-plumbethyl, **7**, 269.
 Sulphate of narcaine, **5**, 259.
 Sulphate of ninaphthylamine, **12**, 154.
 Sulphate of nitraniline, **8**, 177.
 Sulphate of nitrocodaine, **4**, 116.
 Sulphate of paranitraniline, **8**, 178.
 Sulphate of piperidine, **6**, 177.
 Sulphate of potassium, absorption of, by alumina, **21**, 11.
 ——— absorption of, by ferric oxide, **21**, 10.
 Sulphate of potassium and calcium (potasso-gypsite), **3**, 318.
 Sulphate of quinine, **7**, 278.
 ——— oxidation of, **21**, 165.
 ——— polarising crystals produced by the action of iodine on, **5**, 177.
 Sulphate of sodium, aqueous, density and expansibility of, **21**, 1126.
 ——— diffusion of mixtures of, with the chlorides of potassium and sodium, **15**, 234.
 Sulphate of stibethyl, **5**, 69.
 Sulphate of stibmethylum, **5**, 68.
 Sulphate of stibtriamyl, **9**, 284.
 Sulphate of stibtriethyl, **9**, 280.
 Sulphate of tellurethyl, **6**, 43.
 Sulphate of thebaine, **5**, 261.
 Sulphate of triethyl-sulphyl, **17**, 106.
 Sulphate of zinc, diffusion of, **4**, 95.
 Sulphates, action of boracic acid on, **12**, 161.
 ——— amount of combined water in certain double, **25**, 225.
 ——— constitution of, as illustrated by thermometrical researches, **1**, 82.
 ——— isomerism among the, **23**, 118.
 ——— specific heat of, **19**, 200, 227.
 ——— thermo-chemical researches on the dissociation of, **25**, 23.
 ——— volumes of certain anhydrous and double, **11**, 422, 427.
 Sulphates of alcohol-radicals, production of, from the nitrites by means of sulphurous acid, **23**, 115.
 Sulphates, alkaline, thermic researches on the electrolysis of, **24**, 985; **25**, 110.
 Sulphates, basic cupric, formation of, **24**, 1.
 Sulphates of bismuth, **25**, 44.
 Sulphates, double, containing soda and a magnesian oxide, **11**, 49.
 Sulphates, double, thermic effects attending the solution of, **1**, 120.

- Sulphates of thallium, **17**, 136.
 Sulphates, zinc-o-sodic and magnesio-sodic, measurement of the crystals of, **III**, 391.
 Sulphates and chromates of the potash family, thermic effects attending the solution of, in water, **I**, 116.
 Sulphazotate of potassium, **24**, 308.
 Sulphazotised acids, **24**, 307, 659.
 Sulphethers of ethylene, **24**, 1189.
 Sulphide of allyl, **10**, 320.
 Sulphide of arsenictriethyl, **7**, 264.
 Sulphide of barium, compound of, with oil of mustard, **8**, 186.
 Sulphide of barium, preparation of, **25**, 187.
 Sulphide of copper, freshly precipitated, action of hydrosulphate of ammonia on, **18**, 94.
 Sulphide of copper and arsenic, **12**, 9.
 Sulphide of copper and lead from Chile, **14**, 160.
 Sulphide of didymium, **6**, 264.
 Sulphide of ethyl, **7**, 189.
 Sulphide of hydrogen, estimation of, in presence of carbon dioxide, **24**, 582.
 Sulphide of lead, action of light on, and its bearing on the preservation of paintings in picture galleries, **18**, 245.
 Sulphide of lead, effect of heating, in hydrogen and carbonic oxide, **16**, 46.
 Sulphide of mercury, amorphous, occurrence of, in the mineral kingdom, **24**, 671.
 Sulphide of nitrogen, behaviour of triethylphosphine with, **13**, 302.
 Sulphide of potassium, compound of, with oil of mustard, **8**, 185.
 Sulphide of selenium, **24**, 995.
 Sulphide of silver and gold, **25**, 680.
 Sulphide of sodium, reactions of anti-mony compounds with, **25**, 42.
 Sulphide of stannethylum, **6**, 60.
 Sulphide of stibtriethyl, **9**, 279.
 Sulphide of terechlorethyl, **13**, 41.
 Sulphide of thallium, **17**, 135.
 Sulphide of triethylphosphine reduced by sodium, **13**, 303.
 Sulphides, atomic volumes of certain, **III**, 87, 90.
 — capability of certain, to form the negative pole of a galvanic circuit, **24**, 652.
 — decomposition of soluble metallic, by water, **25**, 224, 672.
 — process for the quantitative determination of sulphides, sulphites, hyposulphites, and sulphates, in presence of each other, as adopted in the determination of these salts in "soda waste" as obtained from "black ash," **11**, 166.
 Sulphides, specific heat of, **19**, 196, 225.
 Sulphides of arsenic, **25**, 599.
 Sulphides of copper and iron, **15**, 125.
 Sulphides of ethyl and their derivatives, action of chlorine on the, **13**, 45.
 Sulphides, insoluble, action of iodine on, **24**, 887.
 Sulphides, metallic, electric conductivity of, **24**, 302.
 — — — — — electromotive power of, **24**, 652.
 — — — — — formation of, **25**, 981.
 Sulphides of palladium, **24**, 313.
 Sulphite of calcium, use of, in breweries, **25**, 1130.
 Sulphite of didymium, **6**, 268.
 Sulphite of didymium and potassium, **6**, 272.
 Sulphite of magnesium, acid, **25**, 673.
 Sulphite of potassium, action of, on bodies containing CCl_3 , **25**, 388.
 Sulphites, **III**, 292.
 Sulphites, spontaneous decomposition of various acid, **25**, 224.
 Sulphites of copper and silver, **24**, 1169.
 Sulpho-acids, behaviour of some, in the organism, **25**, 256.
 — — — — — constitution of, **23**, 137.
 — — — — — formation of, **24**, 173.
 — — — — — of amidobenzoic acid, **25**, 717.
 — — — — — of aniline blue, **25**, 717.
 — — — — — of anthraquinone, **25**, 139.
 — — — — — of benzene, **25**, 1016.
 — — — — — conjugate, **9**, 256.
 — — — — — of the mesitylenes, **24**, 376.
 — — — — — of phenol, certain reactions of, **25**, 146.
 — — — — — of orthobromotoluene, **24**, 120.
 Sulphobenzoate of barium, **9**, 255.
 Sulphobenzoic acid, **24**, 131.
 Sulphobenzolic acid, action of potash on, **23**, 137.
 Sulphobromide of carbon, **24**, 781.
 Sulphobromide, phosphoric, decomposition of, by water and alcohol, **25**, 282.
 Sulphobromide of phosphorus, **24**, 1163.
 Sulphobromides of phosphorus, **25**, 983.
 Sulphobromo-chlorides, phosphoric, **25**, 283.
 Sulphobutylic acid, **8**, 271.
 Sulphobutyric acid, **9**, 253.
 Sulphocamphoric acid, **25**, 1098.
 Sulphocaprylate of barium, **7**, 287.
 Sulphocaprylate of potassium, **7**, 288.
 Sulphocarbonate of piperidine, **6**, 178.
 Sulphocarbonyl chloride, **24**, 344.

- Sulphochloride of carbon, **24**, 344.
 Sulphochloride of mercury, preparation of, in the dry way, **8**, 259.
 Sulphochloride of phosphorus, **25**, 38.
 Sulphochloride of phosphorus, action of ammonia on, **18**, 1.
 Sulphocoumarilic acid, **24**, 49.
 Sulphocyanate of acrinyl, **24**, 408.
 Sulphocyanate of allyl, action of, on triethyl phosphine, **13**, 315.
 ——— a constituent of the root of mignonette, **25**, 172.
 Sulphocyanate of ammonium, influence of, on plant-growth, **25**, 917.
 Sulphocyanate of benzoyl, **9**, 264.
 Sulphocyanate of ethyl, **21**, 193.
 Sulphocyanate, mercuric, double salts of, **25**, 626.
 Sulphocyanate, monochlorallylic, **25**, 479.
 Sulphocyanate of phenyl, action of, upon triethyl phosphine, **13**, 309.
 ——— action of acetic acid on, **24**, 140.
 Sulphocyanate of platosammonium, **7**, 38.
 Sulphocyanate of potassium, isomeric, **24**, 391.
 Sulphocyanate of thallium, **17**, 148.
 Sulphocyanate of triethylphosphonium, its deportment under the influence of heat, **13**, 321.
 Sulphocyanate of urea, analysis of, **1**, 230.
 Sulphocyanates, action of oxidising agents upon, **11**, 174.
 Sulphocyanates of ethyl and ethylene, behaviour of triethyl phosphine with, **13**, 318.
 Sulphocyanates of phenyl and allyl, behaviour of arsines and stibines with, **13**, 321.
 Sulphocyanides. See Sulphocyanates.
 Sulphodibromobenzene, **24**, 1055.
 Sulphoform, **24**, 901.
 Sulphomaleic acid, **24**, 131.
 Sulphomorphide, **24**, 56.
 Sulphonaphthoic acid, **25**, 699.
 Sulphonitrodibromobenzene, **24**, 1255.
 Sulphopalladates, **24**, 313.
 Sulphoparaoxybenzoic acid, **25**, 1018.
 Sulphophenylamide, argentobenzo-, **6**, 196.
 Sulphophenylamide, benzo-, **6**, 196.
 Sulphophenylamide, cumbenzo-, **6**, 196.
 Sulphophenylamide, dibenzo-, **6**, 196.
 Sulphopropionate of barium, **9**, 253.
 Sulphopropionic acid, **9**, 252.
 Sulphopseudo-uric acid, **24**, 1058.
 Sulphosalicylic acid, **10**, 218.
 Sulphosalicylic acids, isomeric, **24**, 1052.
 Sulpho-salts, on some new, **24**, 313.
 Sulphotannic acid, synthesis of, **25**, 1019.
o-Sulphotoluene, **25**, 1005.
 Sulphotoluene from bromosulphotoluene, **24**, 120.
 Sulphotriptylic acid, **6**, 288.
 Sulpho-urea corresponding with pseudotoluidine, **25**, 720.
 Sulpho-ureas, so-called, decomposition of, by nitrous acid, **24**, 267.
 Sulphovaleraldehyde, **24**, 560.
 Sulphovinate of sodium, **25**, 853.
 Sulphovinates, **9**, 131.
 Sulphoxanthraquinonic acid, spectra of, **23**, 142.
 Sulphoxyazofinate of potassium, **24**, 308.
 Sulphoxybenzoic acid, action of molten potassium hydrate on, **24**, 1052.
 Sulphur, absorption of, by gold, and its effect in retarding amalgamation, **24**, 765.
 ——— absorption-spectrum of, **25**, 382.
 ——— acids of, **1**, 75.
 ——— action of, on phosphorus pentachloride, **3**, 5.
 ——— action of, on vapour of water, **25**, 220.
 ——— amount of, in coals used in Manchester, **11**, 206.
 ——— amount of, in various agricultural crops, **11**, 281.
 ——— analysis of oxygen-compounds of, **1**, 75.
 ——— application of, in the roasting of ores in the Stetefeldt furnace, **25**, 532.
 ——— behaviour of, with magnesium, **20**, 127.
 ——— estimation of, **17**, 51.
 ——— estimation of, by barium, **24**, 1085.
 ——— estimation of, in cast iron, **24**, 159.
 ——— estimation of, in coal and coke, **24**, 1089.
 ——— estimation of, in iron-ores, **15**, 337.
 ——— estimation of, in coal and in organic compounds, **25**, 1114.
 ——— estimation of, in crude iron, **9**, 20.
 ——— estimation of, in iron, **25**, 89.
 ——— estimation of, in pyrites, **25**, 812.
 ——— heat disengaged in combustion of, **6**, 238.
 ——— influence of lime and common salt in diminishing the amount of, evolved from coal by distillation, **11**, 234.
 ——— mode of treating copper and other ores combined with, **1**, 8 (p).

Sulphur in pig iron, **25**, 546
 — preparation of thallium from, in the wet way, **17**, 117.
 — Russell's method of estimating, **7**, 212.
 — separation of, in the blast-furnace by use of an excess of lime, **22**, 223.
 — separation of, from sulphuretted hydrogen, **25**, 1129.
 — specific gravity of, **111**, 68.
 — specific gravity of melted, **111**, 76.
 — specific gravity of, in the viscid melted state, **111**, 77.
 — specific gravity and atomic volume of flowers of, **111**, 72, 73.
 — specific heat of, **19**, 185.
 — spectrum of, **24**, 1145, 1146.
 — in steel, **21**, 282.
 — symbol of, in Brodie's chemical calculus, **21**, 413.
 — tetratomic and hexatomic, **17**, 106.
 — thermic researches on, **25**, 980.
 — in Wiltshire pig-iron (grey), **17**, 22, 23.
 Sulphur and arsenic, minerals from Chile containing, **12**, 8.
 Sulphur and iron, relative proportion of, in the pyrites of certain specimens of Iowa coal, **25**, 228.
 Sulphur-acids in the air of Manchester, **11**, 206.
 Sulphur-black, fast, **24**, 1223.
 Sulphur chloride, action of, on amylene, **12**, 114.
 — — action of, on aniline in presence of carbon bisulphide, **24**, 261.
 — — action of, on ethylene and amylene, **12**, 112.
 — — action of, on orcin, **20**, 223.
 — — reaction of, with phosphorous chloride, **24**, 491.
 Sulphur dichloride, on the existence of, **24**, 1163.
 Sulphur dioxide, influence of, on plants, **25**, 1108.
 Sulphur dioxide and carbon dioxide, analysis of mixtures of, **25**, 919.
 Sulphur-compound formed by the action of sulphuretted hydrogen on formate of lead, at high temperatures, **15**, 278.
 Sulphur-compounds, behaviour of triethylphosphine with, **13**, 300.
 Sulphur-compounds, new class of, **17**, 105.
 Sulphur ores, roasting of, **24**, 449, 604.
 Sulphur-urea, isolation of, **22**, 1.
 — — gold-salt of, **22**, 6.
 — — mercury-salts of, **22**, 12.
 — — nitrate of, **22**, 6.
 — — platinum-salts of, **22**, 8.
 — — silver-salt of, **22**, 10.
 Sulphur-ureas, **24**, 570.

Sulphuretted acetic ether, **7**, 190.
 Sulphuretted acids, new series of, **7**, 188.
 Sulphuretted diphenylallophanic amyl-ether, **24**, 394.
 Sulphuretted hydrogen, action of, on glyoxylates, **18**, 199.
 — — application of, to analyses in the dry way, **25**, 811.
 — — behaviour of triethyl phosphine with, **13**, 301.
 — — description of an apparatus for generating, **17**, 152.
 — — description of an apparatus for preventing escape of, **20**, 415.
 — — electric spectra of metals in, **17**, 86.
 — — mode of employing, in chemical analysis, **2**, 95.
 — — volumetric determination of, **8**, 227.
 Sulphuretted saline water, **1**, 200.
 Sulphuric acid, action of, upon acetonitrile and acetamide, **9**, 213.
 — — action of, on alcohol and ether, at high temperatures, **25**, 605.
 — — action of, upon the amides and nitriles, **9**, 211.
 — — action of, on aniline, **9**, 259.
 — — action of, on anisic acid, **10**, 211.
 — — action of, on benzonitrile, **9**, 255.
 — — action of, on brasses, **19**, 447.
 — — action of, on bronzes, **19**, 453.
 — — action of, on caoutchouc, **15**, 122.
 — — action of, on codeine, **4**, 115.
 — — action of, on the compound $C_7H_{16}O_3$, **7**, 229.
 — — action of, on copper, **19**, 438.
 — — action of dilute, on datisicine, **19**, 228.
 — — action of, on dibromanthracene, **24**, 19.
 — — action of, on dichloranthracene, **24**, 15.
 — — action of concentrated, on haematin, **24**, 736.
 — — action of, on lead, **16**, 66.
 — — action of, on menaphthalamine, **9**, 12.
 — — action of, on the natural alkaloids, **24**, 56.
 — — action of, on nitrite of amyl, **19**, 337.
 — — action of, on opianic acid, **24**, 378.
 — — action of, on organic chlorides containing oxygen, **24**, 125.
 — — action of, on potassium ferrocyanide, **1**, 59 (p).
 — — action of, on sycoretin, **15**, 65.

- Sulphuric acid, action of, on tin, **19**, 439.
 ——— action of, on zinc, **19**, 437.
 ——— capillary transpiration of, **15**, 432.
 ——— compound of, with nitric acid, **24**, 656.
 ——— concentration of, **24**, 868; **25**, 930.
 ——— decomposition of nitrous, by means of Glover's towers, **25**, 335.
 ——— decomposition of, by pentachloride of phosphorus, **7**, 180.
 ——— determination of the weight of, accumulating at the bottom of the leaden chambers, **19**, 455.
 ——— diffusion of, **4**, 88.
 ——— dissociation of, **22**, 446.
 ——— easy method of purifying, from arsenic, **8**, 258.
 ——— estimation of, in waters, **24**, 439.
 ——— formation of, in animal bodies, **25**, 1033.
 ——— heat disengaged in the hydration of, **6**, 240.
 ——— molecular heat of hydrates of, **24**, 195.
 ——— occurrence of ozone and peroxide of hydrogen in the electrolysis of, **7**, 251.
 ——— organic derivatives of, **24**, 552.
 ——— recovery of nitrous acid in the manufacture of, **24**, 1100.
 ——— reduction of, to hydrogen sulphide by hydrogen in the nascent state, **25**, 786.
 ——— reduction of, by zinc amalgam, **24**, 487.
 ——— source of arsenic in commercial, and preparation of that acid free from arsenic, **15**, 52.
 ——— specific heat, density and expansion of, **24**, 94.
 ——— toxicology of, **24**, 1078.
 ——— in vegetable ash, **11**, 189.
 ——— volatile products of the decomposition of albumin, fibrin, casein, and gelatin by chromic acid and, **1**, 82.
 ——— volumetric estimation of, **24**, 436.
 ——— volumetric estimation of, in waters, **15**, 474.
 ——— aqueous, density and expansibility of, **24**, 1125.
 ——— aqueous, relations between strength and density of, **11**, 161.
 ——— aqueous, of constant boiling point, composition of, **13**, 154.
 Sulphuric acid, chlorhydrated. See Sulphuric Chlorhydrate.
 Sulphuric acid of French manufacture, selenium in, **25**, 595.
 Sulphuric acid, fuming, action of, on mesetylene, **2**, 113.
 ——— compound obtained by the action of, on phenyl chloride, **10**, 106.
 Sulphuric acid and nitric acid, simultaneous action of, on benzoic acid, **18**, 325.
 Sulphuric acid and nitric acid, simultaneous action of, on β -nitrobenzoic acid, **18**, 326.
 Sulphuric acid and peroxide of lead, action of, upon opianyl, **9**, 276.
 Sulphuric acid and peroxide of manganese, oxidation of albumin, fibrin, casein, and gelatin by, **1**, 83.
 Sulphuric anhydride, compounds of, **24**, 193.
 ——— compounds obtained by the action of, on the chlorides of hydrogen and ethyl, **10**, 97.
 Sulphuric and sulphurous anhydrides, reaction of, with phosphorous chloride, **24**, 491.
 Sulphuric chlorhydrate, preparation of, **7**, 180; **22**, 304.
 ——— action of phosphorous chloride on, **25**, 222.
 Sulphuring of woollen stuffs, **25**, 940.
 Sulphurous acid, absorption of, in water, **14**, 2; **17**, 98.
 ——— action of, on bromanil, **23**, 11.
 ——— action of, on certain metals, **24**, 656.
 ——— action of, on platinic chloride, **24**, 891.
 ——— Bailey's process of bleaching with, **24**, 452.
 ——— behaviour of, to phosphates and similar compounds, **25**, 39.
 ——— and its combination with water, **1**, 353.
 ——— determination of its tension, **14**, 15.
 ——— diffusion of, **4**, 89.
 ——— electric spectra of metals in, **17**, 86.
 ——— examination for, **24**, 759.
 ——— salts of, **11**, 292.
 ——— in smoke from common fires, **11**, 232.
 ——— tables of solubility of, in water at different pressures and temperatures, **14**, 11, 15.
 Sulphurous acid and sulphuretted hydrogen, volumetric determination of, **8**, 227.
 Sulphurous anhydride, action of phosphorous chloride on, **25**, 222.
 Sulphurous and carbonic anhydrides, absorption of, in water, **17**, 98.

Sulphuryl chlorides, **24**, 489.
 Sulphuryl hydroxychloride, **24**, 490.
 Sulphydrate of chloral, **25**, 612.
 Sulphydrate of potassium, action of, on acetic ether, **17**, 408.
 Sulphydrate of potassium, action of, on benzoyl chloride, **24**, 900.
 Sulphydic acid, synthesis of, **25**, 220.
 Summer eye, Russian, **25**, 1036.
 Sun, new method of spectroscopic observation of, **24**, 798.
 Sunlight, contributions to our knowledge of the chemical action of, on sensitive photographic papers, **19**, 33.
 Superphosphate, **25**, 268, 1132.
 — examination of, **25**, 1114.
 — preparation of very high grade, from the Mejillones guano, **25**, 849.
 Superphosphates, estimation of phosphoric acid in, **24**, 584.
 — part which ferric and aluminic oxides play in the manufacture of, **25**, 818.
 Supersaturated solutions, behaviour of, when exposed to the open air, **25**, 218.
 Supersaturated solutions, preparation of, **24**, 649.
 Supersaturated solutions of Glauber's salt, action of low temperatures on, **25**, 284.
 Supersaturation of saline solutions and surface-tension of liquids, relation between, **25**, 784.
 Supersaturation of sodium chloride solution, **25**, 284.
 Surface-soil from the Desert of Atacama, analysis of a, **7**, 308.
 Surface-tension of liquids and supersaturation of saline solutions, relation between, **25**, 784.
 Surfaces, clean and unclean, effects of, on the separation of gases and solids from liquids, **22**, 131, 142, 152.
 Surrey water, analysis and properties of, **4**, 397.
 Swedish safety-matches, **25**, 340.
 Sweet volatile principle found in the countchoue of Borneo, **24**, 915.
 Swim-bladder of certain fresh-water fishes, gases contained in the, **25**, 254.
 Sycoceryl acetate, **15**, 67.
 Sycoceryl alcohol, **15**, 71.
 Sycoceryl benzoate, **15**, 74.
 Sycoretin, action of heat on, **15**, 66.
 — action of nitric acid on, **15**, 66.
 — action of sulphuric acid on, **15**, 65.
 Symbol 0 in calculus of chemical operations, **21**, 385.

Symbol 1 in calculus of chemical operations, **21**, 390.
 Symbols of chemical operations, **21**, 384.
 Symbols, on the construction of chemical, **21**, 367.
 Symbols of simple weights, **21**, 397.
 Synanthrose, **24**, 348.
 Synthesis of acids of the lactic series, **22**, 28.
 Synthesis by means of nascent formic acid, **24**, 897.
 Synthesis, methods of, **24**, 155, 156.
 Synthesis of organic acids, new method of, **25**, 142.
 Synthesis of organic substances, **17**, 37.
 Synthesis of tribasic acids, **18**, 331.
 Syrup, decolorising of, **22**, 107.
 — evaporation of, **22**, 120.
 — filtration of, through charcoal, **22**, 109.
Synphyllum asperinum, composition and nutritive value of, **24**, 108.

T.

Table of amidogen, imidogen, and nitrile bases, and of analogues of ammonium oxide, **4**, 326.
 Tables, construction of, exhibiting the composition and mutual relations of organic substances, **15**, 36.
 Tachylite and dolerite of the Sababurg in Hesse, **25**, 129.
 Talc, black colouring matter of, **24**, 329.
 — conversion of serpentine into, **24**, 505.
 Talc, analysis of compact, from North Carolina, **25**, 681.
 Tallow, vegetable, from *Stillingia sebifera*, **8**, 1.
 Tannic acid, **5**, 102.
 — action of, on iodine, starch, and iodised starch, **25**, 73.
 — action of, on paranitraniline, **8**, 178.
 — composition of, **7**, 271.
 — nature and constitution of, **24**, 550; **25**, 1098.
 Tannic acid and derivatives therefrom, **25**, 245.
 Tannin, action of hydrochloric acid on, **1**, 137.
 — application of, to the treatment of wines, **25**, 272.
 — clean surface of, and its use in photography, **24**, 1051.
 — dialysis of, **15**, 256.
 — diffusion of, **15**, 222.

- Tannin, estimation of, in catechu, &c., **24**, 762.
 — estimation of, in oak-bark, **24**, 594.
 — separation of the colouring matter of blood by a solution of, **25**, 929.
 — use of, for the preservation of wine, **24**, 1099.
- Tanning, endeavours to establish the art of, on a scientific basis, **25**, 1144.
 — means of testing the comparative value of certain astringent substances for the purposes of, **III**, 319.
- Tannins, technology of, **25**, 1144.
- Tantalates, natural, composition of, **25**, 189.
 — — determination and separation of metallic acids in, **25**, 193.
- Tantalie compounds, composition of, **24**, 1013.
- Tantalite, composition of, **25**, 196.
 — minerals isomorphous with, **25**, 203.
- Tantalum, separation of, from tin and tungsten, **25**, 193.
 — separation of, from titanium, **25**, 194.
- Tap-cinder for puddling, **25**, 556.
- Tapiolite, composition of, **25**, 198.
 — minerals isomorphous with, **25**, 204.
- Tar-red, **14**, 249.
- Tarry matters in the air of towns, **11**, 231.
- Tartaric acid, **8**, 180.
 — action of nitric acid on, **8**, 181.
- Tartaric acid, **8**, 181.
- Tartaric acid, **8**, 180.
- Tartaric acid, **8**, 179.
 — action of nitric acid on, **8**, 181.
- Tartar, crude, composition of, **24**, 867.
- Tartaric acid, **3**, 80.
 — — action of pentachloride of phosphorus on, **13**, 9.
 — — action of potassium permanganate on, **25**, 608.
 — — anilides of, **8**, 179.
 — — artificial production of, from bibromosuccinic acid, **13**, 102.
 — — basicity of, **20**, 138.
 — — chloromaleic acid obtained from, **16**, 198.
 — — examination of citric acid for crystals of, **25**, 330.
 — — heat produced by the combination of, with bases, **24**, 981.
 — — manufacture of, **25**, 187.
 — — osmose of, **8**, 59.
 — — prevention of precipitation of various substances by, **10**, 117.
 — — production of, by the action of sodium-amalgam on ethylic oxalate, **25**, 375.
- Tartaric acid, reactions of, **8**, 306.
 — — recovery of, from the residues of the "discharge" process, **24**, 172.
 — — transformation of the two kinds of, into racemic acid, **6**, 277.
- Tartaric acid, inactive, discovery of, **6**, 277.
- Tartaric acids, mutual convertibility of dextro- and laevo-, **25**, 1094.
- Tartaric ether, action of benzoyl chloride on, **20**, 138.
- Tartaric ether, action of sodium on, **20**, 154.
- Tartaric ether, action of succinyl chloride on, **20**, 143.
- Tartrate of beryllium, **24**, 1013.
- Tartrate of calcium, **8**, 306.
- Tartrate of calcium, quantity of crystallisation-water in, **25**, 375.
- Tartrate of ethylene-hexethyl-diphosphonium, **14**, 100.
- Tartrate of lead, **1**, 25.
- Tartrate of paranitraniline, **8**, 178.
- Tartrate of silver, **1**, 24.
- Tartrates of thallium, **17**, 150.
- Tartronic acid, its relation to pyracemic acid, **16**, 263.
- Tartrophthalic acid, **24**, 374.
- Taste of waters, observation of, **18**, 118.
- Taurine, constitution of, and of a body isomeric with it, **1**, 191.
 — behaviour of, in animal bodies, **25**, 1033.
 — artificial production of, **7**, 281.
 — chemical composition and artificial formation of, **15**, 94.
 — formation of, from chlorethyl-sulphuric acid, **15**, 101.
- Tea, amount of nitrogen in black, **25**, 1034.
- Tea, black and green, examination of, **1**, 208; **4**, 108.
- Tea from the Himalayas, **24**, 571.
- Tea, Paraguay, **1**, 217, 238.
- Tea, tannin of, **1**, 208.
- Teak-wood, existence of considerable deposits of crystallised calcium phosphate in, **15**, 91.
- Teas, adulteration and sophistication of, **4**, 162.
- Teas, colouring of, **4**, 157.
- Teas of commerce, observations on the, **4**, 156.
- Teas, green, of commerce, **11**, 73; **5**, 139.
- Teeth, cement for stopping the cavities of, **3**, 367.
- Tellurethyl, compounds of, **6**, 10—43.
- Tellurethyl chloride, **5**, 72.
- Tellurethyl nitrate, **5**, 72.

- Tellurethyl oxide, **5**, 72.
 Telluride of ethyl, **5**, 71.
 Tellurium, absorption-spectrum of the vapour of, **25**, 665.
 — specific gravity and atomic volume of, **11**, 62.
 — spectrum of, **24**, 1145, 1146.
 Tellurium organo-compounds, formation of, **13**, 187.
 — — properties of, **13**, 225.
 Telluromethyl, **8**, 164.
 Tellurous chloride and bromide, absorption-spectra of the vapours of, **25**, 665.
 Temperature, effects of, on the absorption of gases by charcoal, **25**, 649.
 — effects of, on diffusion, **15**, 235.
 — influence of, on circular polarisation, **13**, 260.
 — influence of, on the molecular rotatory power of some polarising substances, **25**, 970.
 — influence of, on the specific refractive energy of elements and their compounds, **18**, 109.
 — relative expansions of mixtures of alcohol and water under the influence of a certain rise of, **2**, 224.
 Temperature of flames, **13**, 273.
 Temperature of the soil, influence of the, on the development of certain plants, **25**, 167.
 Temperatures, ordinary and furnace, measurement of, by increase of electric resistance in conductors with rise of temperature, **24**, 178.
 Temperatures of solidification of saline solutions, **25**, 1062.
 Tenacity of alloys, **20**, 215.
Tenebrio molitor, respiration of the larvæ of, **25**, 836.
 Tension of sulphurous acid, determination of **14**, 15.
 Ter, as prefix. See Tri.
 Terebene, constitution of, **25**, 441.
 Terebene, formation of, from dianylene, **25**, 1087.
 Terebenes, **25**, 436.
 Terephthalic acid, **14**, 57.
 — — formation of, by oxidation of terpenes, **25**, 436.
 — — formation of, from parasulphobenzoic acid, **25**, 622.
 Teropianumone, **5**, 261.
 Terpene dibromide, **25**, 1009.
 Terpenes, **25**, 436.
 Terpenes, refraction-equivalents of, **23**, 151.
 Terpin hydrate, vapour-density of, **24**, 707.
 Tertiary alcohol, formation of a new, **25**, 1093.
 Tertiary alcohols, oxidation of, **25**, 295.
 Tertiary monamidic acids, **12**, 100.
 Testicles, starch in the, **25**, 256.
 Test-liquor, preparation of, for the determination of chloride of sodium, **6**, 10.
 Tetrabasic or ortho-carbonate of ethyl, **17**, 198.
 Tetrabenzodulcitan, **25**, 1093.
 Tetrabromide of carbon, **23**, 154, 161; **24**, 773.
 — — from bromoform, **23**, 163.
 — — from bromopierin, **23**, 162.
 — — action of reducing agents on, **23**, 165.
 — — action of carbon disulphide on, **23**, 161.
 Tetrabrominated anthracene, **15**, 50.
 Tetrabutylalidine, **54**, 401.
 Tetracetodulcitate, **25**, 400.
 Tetracetylated milk-sugar, **25**, 70.
 Tetracetyl-dahlia-inulin, **25**, 68.
 Tetracetyl-saccharose, **25**, 69.
 Tetracetyl-sappanin, **25**, 819.
 Tetracetyl-tannic acid, **25**, 245.
 Tetrachlorethane produced by the action of phosphorus pentachloride on dichloraldehyde, **24**, 1191.
 Tetrachlorethyl oxide, **24**, 514.
 Tetrachloride of carbon, action of phosphorus pentachloride on, **25**, 452.
 — — action of, on phosphorus pentoxide, **25**, 605.
 Tetrachloride of tungsten, **25**, 287.
 Tetrachlorocoumarin, **24**, 45.
 Tetrachloroacetonylene, formation of, from erotonic chloral, **24**, 234.
 Tetrachloro-diacetone-cyanhydrin, **24**, 922.
 Tetrachloronaphthalene, **25**, 65.
 Tetracodeine, formation of, **25**, 506.
 — physiological action of, **25**, 509.
 Tetracrylic acid, **24**, 815.
 Tetrahydrate of nitric acid, **11**, 403.
 Tetrahydrophthalic acid, **24**, 373.
 Tetrallylammonium bromide, **25**, 1002.
 Tetrallylammonium hydrate, **10**, 326.
 Tetrallylarsonium iodide, **10**, 327.
 Tetramargarin, **6**, 284.
 Tetramethylammonium iodide, **4**, 321.
 Tetramethylammonium oxide, **4**, 324.
 Tetramethylammonium, platinum salt of, **4**, 321.
 Tetramethylphosphonium, gold and platinum salts of, **11**, 74.
 Tetramethylphosphonium, action of heat on hydrated oxide of, **11**, 74.
 Tetramethylphosphonium iodide, **11**, 74.
 Tetranitro-acridine, **24**, 711.
 Tetranitro-diphenyl, **24**, 509.
 Tetranitronaphthalene, **25**, 700.

Tetrapalmitin, **6**, 284.
 Tetraphenyl-ethylene, **24**, 119; **25**, 472.
 Tetraphosphodiamic acid, ammoniated, **21**, 273.
 Tetraphospho-hexamide, **21**, 273.
 Tetraphosphopentamic acid, terammoniated, action of heat on, **22**, 21.
 Tetraphosphoric amides, **21**, 261.
 Tetraphosphotetramic acid, **21**, 272.
 Tetraphosphotetrimate of silver, **21**, 270.
 Tetraphosphotetrimic acid, **22**, 22.
 Tetrasalicylide, **25**, 819.
 — formation of, from salicylic acid, **25**, 246.
 Tetrasodium vanadate, **24**, 31.
 Tetrastearin, **6**, 283.
 Tetrasulphate of copper, **1**, 223.
 Tetrasulphodiphenylenates, **20**, 98.
 Tetrasulphodiphenylenic acid, **20**, 98.
 Tetrazodiphenyl compounds, **20**, 92.
 Tetrazodiphenyl compounds, products of decomposition of, **20**, 95.
 Tetrazodiphenyl, decomposition of the platinum-salt of the perbromide of, **20**, 101.
 Tetrazodiphenyl nitrate, action of water on, **20**, 96.
 Tetrazodiphenyl sulphate, action of alcohol on, **20**, 97.
 Tetrazodiphenyl sulphate, action of sulphuric acid on, **20**, 98.
 Tetrazoresorcin nitrate, **24**, 831.
 Tetrazoresorfin nitrate, **24**, 831.
 Tetrethylammonium, gold-salt of, **4**, 311.
 Tetrethylammonium iodochloride, **19**, 117.
 Tetrethylammonium, mercury-salts of, **4**, 311.
 Tetrethylammonium oxide, **4**, 307.
 Tetrethylammonium salts, **4**, 310.
 Tetrethylarsonium tri-iodide, **24**, 939.
 Tetrethylphosphonium platinochloride, crystalline form of, **14**, 160.
 Tetrethylphosphonium, gold and platinum salts of, **11**, 66.
 Tetrethylphosphonium, hydrated oxide of, **11**, 65.
 Tetrethylphosphonium, action of heat on hydrated oxide of, **11**, 66.
 Tetrethylphosphonium iodide, **11**, 64.
 Tetrethyl-phosphonium iodide, crystalline form of, **14**, 109.
 Tetrethylphosphonium tri-iodide, **24**, 929.
 Tetrethylstibine chloride, **13**, 119.
 Tetrethylstibine oxide, **13**, 119.
 Tetrethylstibine salts, **13**, 119.
 Tetrethylstibonium tri-iodide, **24**, 930.
 Tetrolic acid, **24**, 815.

Tetronerythrin, an organic colouring matter, **25**, 511.
 Tetroxide of potassium, action of carbonic acid on, **14**, 285.
 — — action of carbonic oxide on, **14**, 281.
 — — action of nitric oxide on, **14**, 288.
 — — analysis of, **14**, 274.
 — — preparation of, **14**, 268.
 Tetroxide type, **16**, 293.
 Tetrylene-triamine, its formation by the action of nascent hydrogen on cyaniform, **17**, 364.
 Tetryl series, inverse formation in the, **25**, 478.
 Textile-fabrics, protection of, from fire, **25**, 337.
 Thallium, **17**, 112.
 — aqueous oxide of, **17**, 130.
 — atomic weight of, **17**, 123.
 — combustion of, **17**, 123.
 — compounds of, **25**, 987.
 — diamagnetism of, **17**, 125.
 — double salts of, **24**, 461.
 — electric conductivity of, **17**, 125.
 — electric spectrum of, **17**, 81, 124.
 — green line in spectrum of, **17**, 124.
 — history of, **17**, 115.
 — memoirs relating to, **17**, 112.
 — occurrence of, in iron pyrites, **17**, 145.
 — occurrence of, in sphalerite, **24**, 312.
 — occurrence of, in zinc-ores, **17**, 144.
 — organic compounds of, **17**, 148.
 — position of, in the metallic series, **17**, 126.
 — preparation of, from commercial hydrochloric acid, **17**, 118.
 — preparation of, from the flue-dust of pyrite-burners, **17**, 118.
 — preparation of, from iron pyrites, **17**, 116.
 — preparation of, on the large scale, **25**, 1075.
 — preparation of, from the saline residues of the salt-works at Naheim, **17**, 117.
 — preparation of, from sulphur or pyrites in the wet way, **17**, 117.
 — purification of, **17**, 119.
 — reduction of, **17**, 125.
 — reduction of, from the chloride, **25**, 880.
 — sources of, **17**, 115.
 — specific gravity of, **17**, 122.
 Thallium acetate, **17**, 149.
 Thallium-benzamide, **17**, 151.
 Thallium benzoate, **17**, 151.
 Thallium bichloride, **17**, 140.

Thallium borate, **17**, 134.
 — bromide, **17**, 138.
 — chromates, **17**, 142.
 — citrate, **17**, 151.
 — cyanate, **17**, 148.
 — cyanide, **17**, 148.
 — ethylate, **17**, 149.
 — ferri- and ferro-cyanide, **17**, 148.
 — formate, **17**, 148.
 — hyposulphite, **17**, 136.
 — iodide, **17**, 137.
 — malate, **17**, 150.
 — nitrate, **17**, 141.
 — oxalates, **17**, 150.
 — oxide, hydrated, **17**, 130.
 — oxides, **17**, 128.
 — paratartrate, **17**, 151.
 — perchlorate, **19**, 504.
 — peroxide, **13**, 132.
 — phosphate, **17**, 135.
 — pierate, **17**, 151.
 — protochloride, **17**, 138.
 — protoxide, **17**, 128.
 — pyrophosphotriamiate, **19**, 8.
 — salts, **17**, 131.
 — selenide, **17**, 137.
 — sesquichloride, **17**, 139.
 — sulphates, **17**, 136.
 — sulphides, **17**, 135.
 — sulphocyanate, **17**, 148.
 — tartrates, **17**, 150.
 — terechloride, **17**, 140.
 — urate, **17**, 151.
 — valerate, **17**, 151.
 Thallium and aluminium, sulphate of, **17**, 142.
 Thallium and bismuth, simultaneous occurrence and separation of, **17**, 143.
 Thallium and cadmium, simultaneous occurrence of, **17**, 144.
 Thallium and copper, alloy of, **17**, 146.
 Thallium and gold, chloride of, **17**, 147.
 Thallium and hydrogen, supposed compound of, **17**, 132.
 Thallium and lead, alloy of, **17**, 145.
 Thallium and manganese, simultaneous occurrence of, **17**, 143.
 Thallium and mercury, amalgam of, **17**, 146.
 Thallium and platinum, alloy of, **17**, 147.
 — — double chloride of, **17**, 147.
 Thallium and tin, alloy of, **17**, 145.
 Thames water, analysis of, **4**, 379, 380.
 — — organic matter in, **4**, 387.
 Thames and Lea water, average hardness of, **4**, 387.
 Thebaine, **5**, 260; **15**, 451.
 — — microscopical characters of, **18**, 37.

Theine, action of nitric acid on, **1**, 219.
 — — analysis of, **1**, 220.
 — — extraction of, from tea, **20**, 188.
 — — formula of, **1**, 238.
 — — found in Paraguay tea, **1**, 217, 238.
 — — preparation of, **1**, 215.
 — — prepared by sublimation, analysis of, **1**, 237.
 Theoretic teaching of chemistry, considerations on some points of the, **25**, 941.
 Thermal effects of the combination of alcohols with bases, **24**, 975.
 Thermal effects produced during the electrolysis of the hydracids, **25**, 25.
 Thermic coefficients of hydro-electric and thermo-electric currents, **25**, 115.
 Thermic researches on electrolysis, **25**, 111.
 — — — on the electrolysis of the alkaline bases and sulphates, **25**, 110.
 — — — on sulphur, **25**, 980.
 — — — on voltaic energy, **24**, 1134, 1136.
 Thermochemical determinations, inaccuracy of Favre and Silbermann's, made with the mercury calorimeter, **24**, 876.
 Thermochemical researches on ammoniacal salts, **24**, 1128; **25**, 19, 21.
 — — — on compounds formed by double decomposition, **25**, 973.
 — — — on the cyanogen series, **24**, 982.
 — — — on dissociation, **25**, 22.
 — — — on the electrolysis of the alkaline bases and of the sulphates of the alkalis, **24**, 985.
 — — — on the formation of precipitates, **25**, 107.
 Thermo-electric action of liquids and metals, **24**, 476.
 Thermo-electric battery of great power, **24**, 989.
 Thermo-electric currents generated in elements where bismuth is used to form the joint, **8**, 33.
 Thermo-electric currents, thermic coefficients of, **25**, 115.
 Thermo-electric force of metals, **25**, 779.
 Thermo-electric forces, measurement of, **24**, 101.
 Thermo-electric joints formed with the metals antimony, bismuth, and palladium, **8**, 36.
 Thermo-electric properties of bismuth

- and antimony, when used as single elements, **10**, 77.
- Thermo-electric properties of zinc and silver, **7**, 309.
- Thermometer, description of a combined maximum and minimum mercurial, **15**, 299.
- Thermometers, maximum and minimum mercurial, **10**, 221; **11**, 106.
- Thermometers, comparison of mercurial and air, **24**, 483.
- Thermo-regulator, **25**, 383.
- Thermo-regulator, automatic, **24**, 639.
- Thermo-regulator (gas) for high temperatures, **25**, 667.
- Thiaacetate of ethyl, **7**, 190.
- Thiaacetate of ethyl, **7**, 189.
- Thiaacetic acid, **7**, 189.
- Thiaddin, **III**, 303.
- alleged transformation of, into leucine, **10**, 199, 202.
- contributions to the history of, **10**, 193.
- Thiaddin hydrochloride, **III**, 307.
- Thiaddin nitrate, **III**, 308.
- Thickening, protection of, from becoming sour and mouldy, **25**, 272.
- Thickening material, action of potassic chromate on, **24**, 1223.
- Thierschite, **6**, 112.
- Thigh-bone, analysis of a sub-fossilised, **24**, 424.
- Thio-acetanilide, **24**, 567.
- Thio-aniline, **24**, 566.
- Thioformic acid, **9**, 184.
- Thiohydrobromobenzoic acid, **24**, 371.
- Thio-isopropyl alcohol, **25**, 998.
- Thionyl chloride, reaction of, with phosphorous chloride, **24**, 491.
- Thiophosphamate of cadmium, **18**, 6.
- Thiophosphamate of lead, **18**, 6.
- Thiophosphamic acid, **18**, 7.
- Thiophosphodiamate of cadmium, **18**, 4.
- Thiophosphodiamate of copper, **18**, 3.
- Thiophosphodiamate of zinc, **18**, 4.
- Thiophosphodiamic acid, **18**, 8.
- Thiosulphocarbaniide, **24**, 567.
- Thiutoluidine, **24**, 567.
- Thorium oxide, atomic volume and specific gravity of, **III**, 92.
- Three-carbon ether, **4**, 232.
- Three-carbon series, action of chlorine on various bodies of the, **24**, 1190.
- Thyme, oil of, **17**, 13.
- Thymocymene, **24**, 353.
- Thymol, action of liquid phosgene on, **24**, 338.
- Thymol, derivatives of, **24**, 350.
- Thymoquinone, **24**, 351.
- Thymus Serpyllum* and *Th. vulgaris*, essential oils from, **25**, 1.
- Time, effect of, in the production of chemical compounds, **1**, 397.
- Time-fuses, combustion of: influence of atmospheric pressure on its rate, **15**, 170.
- Tin, action of ammonium sulphhydrate on, **25**, 981.
- action of chlorine on heated, **24**, 956.
- action of, upon iodide of ethyl, **6**, 58.
- action of sugar on, **7**, 199.
- action of sulphuric acid on, **19**, 439.
- crystals of, **4**, 242.
- estimation of, **25**, 274.
- modification of the reactions of, by citric acid, **10**, 116.
- observations made during the analysis of commercial, **24**, 956.
- organo-compounds of, formation of, **13**, 181.
- organo-compounds of, properties of, **13**, 199.
- peculiar state of the molecules of, **25**, 989.
- separation of, from antimony, **15**, 462; **25**, 177.
- separation of, from niobium and tantalum, **25**, 193.
- solubility of, **II**, 19.
- specific gravity and atomic volume of, **III**, 61, 69.
- symbol of, in Brodie's chemical calculus, **21**, 441.
- use of, for the estimation of phosphoric acid, **23**, 384.
- use of, to separate phosphoric acid from bases, **21**, 517.
- Tin amalgam, **16**, 386.
- Tin bichloride, action of, on mercuric ethyl, **16**, 21.
- — compound of, with diplatossammonium chloride, **5**, 219.
- — latent heat of vapour of, **1**, 35.
- — osmose of, **8**, 60, 94.
- — preparation of fuchsine by the action of, on aniline, **14**, 237.
- Tin binocide, crystallised, **10**, 119.
- — dialysis of, **15**, 235.
- — specific gravity and atomic volume of, **III**, 82.
- Tin (Jews'), analysis of the incrustated surface of a block of, **25**, 675.
- Tin, melted, specific gravity of, **III**, 74.
- Tin, metallic, and potassium bichromate, quantitative ratio of, **4**, 246.
- Tin, single and double muriate of, **4**, 245.
- Tin protochloride, compound of, with diplatossammonium chloride, **5**, 219.

- Tin protochloride, composition of crystallised, **4**, 247.
 ——— valuation and composition of, **4**, 239; **7**, 50.
 Tin salt of ethylene-hexethyl-diphosphonium, **14**, 102.
 Tin salts, osmose of, **8**, 92.
 Tin selenite, **2**, 68.
 Tin sulphide and bisulphide, specific gravities and atomic volumes of, **11**, 89.
 Tin, antimony, and arsenic, qualitative distinction of, **4**, 329.
 Tin, antimony, and arsenic, detection and qualitative separation of, **5**, 104.
 Tin and cadmium, reciprocal precipitation of, **9**, 293.
 Tin and its compounds, spectra of, **24**, 1147.
 Tin and copper, alloys of. See Bronze.
 Tin and copper, reciprocal precipitation of, **9**, 291.
 Tin and hydrochloric acid, action of, on hæmatin, **24**, 736.
 Tin and lead, physical properties of the alloys of, **15**, 106.
 Tin and lead, reciprocal precipitation of, **9**, 292.
 Tin, lead, antimony, and copper, analysis of alloys containing, **15**, 462.
 Tincture of rhubarb, investigation of a deposit found in, **10**, 298.
 Tinfoil and its adulteration with lead, **4**, 50.
 ——— colouring of, **25**, 1139.
 Tissue-change during fasting, **25**, 84.
 Tissue-change, influence of cutaneous irritation on, **25**, 312.
 Tissue-change in phosphorus poisoning, **24**, 946.
 Tissue, muscular, distribution of albumin through, **17**, 405.
 Titanic acid, crystallisation of, **24**, 200.
 ——— dialysis of, **15**, 256.
 ——— general occurrence of, in clays, and the method employed to estimate it; separation of oxide of iron from titanic acid, **15**, 311.
 ——— liquid, **17**, 325.
 ——— separation of pure, **15**, 324.
 ——— special experiments on the estimation of, **15**, 325.
 ——— specific gravity and atomic volume of, **11**, 83.
 Titanic acid and alumina, experiments on the separation of, **15**, 325.
 Titanic acid and ammonia, experiments with, **15**, 327.
 Titanic acid and sesquioxide of iron, separation of, **15**, 326, 332.
 Titanic acid and silica, determination of, in fire-bricks, **15**, 322.
 Titanic acid, alumina, and sesquioxide of iron, separation of, **15**, 333.
 Titanic compounds crystallised from fluxes, **25**, 122.
 Titaniferous minerals, use of, in the manufacture of iron and steel, **16**, 387.
 Titanium, **2**, 352.
 Titanium, cyanogen compounds of, **3**, 177.
 ——— detection and estimation of, **16**, 390.
 ——— occurrence of, in iron-ores, **15**, 339.
 ——— occurrence of, in pig-iron, **16**, 387; **25**, 551.
 ——— separation of, from niobium and tantalum, **25**, 194.
 ——— specific gravity and atomic volume of, **11**, 62.
 ——— spectrum of, **24**, 1147.
 ——— in trap rocks, **25**, 1116.
 Titanium bichloride, action of, on stannic diethyl, **16**, 23.
 ——— compound of, with hydrogen cyanide, **8**, 178.
 Titanotriamine, **19**, 255.
 Titrated acid used in nitrogen determinations, **16**, 141.
 Titration of compound ethers, **20**, 170.
 Tobacco, analysis of the ashes of, **11**, 192.
 ——— physiological action of, when used as a narcotic, **24**, 1075.
 Tobacco smoke, constituents of, **24**, 1075.
 Toluene compounds, **24**, 510.
 Toluene of ethyl, **11**, 430.
 Toluates, metallic, **11**, 429.
 Toluene, **11**, 437; **3**, 184.
 ——— conversion of, into cresols, **25**, 481.
 ——— determination of the chemical positions in some derivatives of, **24**, 680.
 ——— preparation of, **11**, 371.
 ——— sulphur derivatives of, **25**, 1096.
 Toluene-disulphonic acid, **25**, 1017.
 Toluene-sulphonic acids, oxidation of, **24**, 1052.
 β -Toluene-sulphonic chloride, action of, on amides, **25**, 148.
 Toluic acid, composition and properties of, **11**, 427.
 ——— formation of, by the action of nitric acid upon cymene, **11**, 425.
 ——— products of the decomposition of, **11**, 431.
 Toluic acid (*o*), nitration of, **25**, 1097.
 Toluidine, **11**, 367.
 ——— action of, on chloral, **25**, 611.
 ——— action of cyanogen chloride on, **3**, 154.

- Toluidine, action of iodide of ethyl on, **7**, 68.
 — composition of, **11**, 375.
 — compounds of, **11**, 377.
 — compounds of, with metallic iodides, **25**, 249.
 — conversion of aniline into, **23**, 1023.
 Toluidine (meta-), derivatives of, **24**, 563.
 Toluidine (nitro-ortho-), **24**, 563.
 Toluidine, phosphoplatinic compounds containing, **25**, 826.
 — preparation of, **11**, 373; **3**, 154.
 — products of the decomposition of, **11**, 380.
 — properties of, **11**, 375.
 — reactions of, **25**, 824.
 Toluidine binoxalate, **11**, 378.
 Toluidine hydrochloride, **11**, 379.
 Toluidine platinochloride, **11**, 379.
 Toluidine sulphate, **11**, 378.
 Toluidine and cumidine, action of cyanogen on, **1**, 170.
 Toluidines, dimethylised, formation of, **25**, 1022.
 Toluidines, isomeric, **25**, 822.
 Toluidines, separation of the two isomeric, **25**, 248.
 Toluol. See Toluene.
 Toluquinones, **23**, 135.
 Toluylene-diamines. See Toluylene-diamines.
 Toluylene alcohol, **25**, 137.
 Toluylie acid. See Toluic Acid.
 Tollyl cyanate, **24**, 139.
 Tollylamine, **16**, 186.
 Tollyne compounds, **25**, 817.
 Tollyne-diamines, isomeric, **24**, 565, 683.
 Tollyne dichloride, derivatives of, **25**, 136.
 Tollyne-glycol, **25**, 816.
 Tollyl-ethyl-urea, **16**, 194.
 Tollyl-phenyl-ammonium cobaltcyanide, **24**, 390.
 Tollyl series, contributions to the history of, **16**, 186.
 Tollyl-succinylamide, **16**, 195.
 Tollyl-sulphamic acid, **16**, 188.
 Tollyl-urea, **16**, 190.
 Tollyl-urethane, **24**, 139.
 Tonka beans, preparation of coumarin from, **111**, 208.
 Topaz, pyroelectric properties of, **24**, 669.
 Tourmaline from the island of Giglio, **25**, 795.
 Towns, air of, **11**, 196.
 Town sewage, composition, value, and utilisation of, **19**, 80.
 Town sewage, manurial value of, **10**, 277.
 Toxicology of the benzene-group, of nitroglycerin, nitric acid, and sulphuric acid, **24**, 1078.
 Transformations produced by catalytic bodies, **111**, 348.
 Transparency, photographic, of various bodies, **17**, 59.
 Transpiration, capillary liquid, in relation to chemical composition, **15**, 427.
 Transpiration, liquid, **25**, 219.
 Transudates, serous, occurrence of paralbumin in, **25**, 310.
 Trap-rocks, occurrence and detection of vanadium and titanium in, **25**, 1116.
 Treadwheel experiments to determine the amount of actual energy developed in the body, as compared with the amount of muscle-consumption, **21**, 41.
 Triacetin, **7**, 282.
 Triacetyl-anilidin, **25**, 67.
 Triacetyl-cellulose, **25**, 66.
 Triacetyl-dahlia-inulin, **25**, 68.
 Triacetyl-elecampene-inulin, **25**, 68.
 Triacetyl-gallic ether, **25**, 246.
 Triacetyl-glucose, **25**, 69.
 Triacetyl-glycogen, **25**, 67.
 Triallylamine, **10**, 326.
 Triamides, **12**, 86.
 Triamides, organo-metallic, **12**, 91.
 Triamidobenzene, **25**, 303, 715.
 Triamidobenzoic acid, **25**, 714.
 Triamines, **11**, 267.
 Triammoniated tetraphosphopentamic acid, action of heat on, **22**, 21.
 Triammonium-compounds, **11**, 271.
 Triamylamine, formation and salts of, **4**, 323.
 Tribasic acetic ether, **24**, 515.
 Tribasic acids, synthesis of, **18**, 331.
 Tribasic phosphite of anyl, **7**, 218.
 Tribenzhydroxylamine, **25**, 416.
 Tribenzoicin, **7**, 282.
 Tribenzylmelamine, **25**, 1026.
 Tribromaniline, **11**, 296; **25**, 305.
 Tribromethylene, **14**, 207.
 Tribromhydroquinone, **23**, 11.
 Tribromobenzoic acid, **18**, 307.
 Tribromocodine, **4**, 117.
 Tribromoquinone, **23**, 12.
 Tribromortholuidine, **24**, 1062.
 Tribromotoluene, **24**, 1062.
 Tributylamine, **24**, 122, 523.
 Tributyrin, **7**, 282.
 Tricalcic phosphate, solubility of, **19**, 296.
 Triacprylamine, **18**, 294.
 Triacarballylic acid, formation of, **18**, 332.
 Triacarballylic acid, salts of, **18**, 337.
 Triacarballylic ether, **18**, 335.

- Tricarbinols, **19**, 56.
 Trichloracetates, metallic, **24**, 1043;
 25, 481.
 Trichloroacetic acid, **24**, 232.
 — action of potassium sulphite
 on, **25**, 391.
 — preparation of, **24**, 812.
 Trichloroamylene chlorosulphide, **13**,
 41.
 Trichloroangelic acid, **25**, 485.
 Trichloroaniline, **11**, 286.
 Trichloroethyl oxide, **24**, 514.
 Trichloroethyl sulphide, **13**, 41.
 Trichloroethylidene - ditolylamine, **25**,
 611.
 Trichlorohydrin, action of chlorine on
 the isomerides of, **24**, 1190.
 — isomerides of, **25**, 399.
 — physiological action of, **25**, 902.
 Trichlorohydroquinone, **21**, 146.
 Trichloride of antimony; its action on
 mercuric methyl, **16**, 22.
 Trichloride of phosphorus, action of, on
 ethylic diethoxalate, **18**, 133.
 — action of, on ethylic dimeth-
 oxalate, **18**, 141.
 — action of, on ethylic ethometh-
 oxalate, **18**, 139.
 — action of, on ethylic lactate,
 18, 144.
 — action of, on ethylic leucate,
 18, 133.
 — action of, on zinc-ethyl, **11**,
 59.
 — decomposition of, by water,
 24, 660.
 — solidification of, **24**, 1162.
 Trichloride of thallium, **17**, 149.
 Trichlorobenzamide, **25**, 715.
 Trichlorobenzoic acid, **25**, 715.
 — formation of, from chrysanisic
 acid, **24**, 555.
 Trichlorobenzoyl chloride, **25**, 715.
 Trichlorobromohydroquinone, **21**, 149.
 Trichlorobromoquinone, **21**, 149.
 Trichlorocrotonamide, **24**, 233.
 Trichlorocrotonic acid, **24**, 233, 558.
 Trichlorocrotonic aldehyde, **24**, 557.
 Trichlorocrotonyl chloride, **24**, 233.
 Trichloroformene-sulphonate of potas-
 sium, action of potassium sulphite on,
 25, 389.
 Trichloroformene-sulphonic chloride, ac-
 tion of potassium sulphite on, **25**,
 389.
 Trichlorolactic acid, **25**, 485.
 — formation of, from chloral-
 cyanhydrate, **25**, 408.
 Trichloronaphthalene, **25**, 65.
 Trichlorophenolsulphonic acid, **25**, 97.
 Trichloroquinone, **21**, 147.
 Trichlororein, **25**, 297.
 Tricoelene, physiological action of, **25**,
 509.
 Tricyanide of allyl, preparation of, **18**,
 332.
 Tricyantribenzyltriamine, **25**, 1026.
 Tridymite, new mode of, occurrence of,
 25, 128.
 Triethide, stannic, **24**, 223.
 Triethoxyl-pyrophosphoric sulphobro-
 mide, **25**, 984.
 Triethylamine, **3**, 96, 301.
 — absorption of its vapour by char-
 coal, **21**, 188.
 — action of amyl iodide on, **4**, 313.
 — action of ethyl bromide and iodide
 on, **4**, 304.
 — action of methyl iodide on, **4**,
 312.
 — formation of, **10**, 208.
 Triethylamylphosphonium, action of
 heat on hydrated oxide of, **11**, 72.
 Triethylamylphosphonium iodide, **11**,
 71.
 Triethylarsine, action of, on bromide of
 bromethyl-triethylphosphonium, **14**,
 333.
 Triethylarsine, action of ethylene dibro-
 mide on, **14**, 336.
 Triethyl-benzylphosphonium chloride,
 14, 343.
 Triethyl-carbinol, **24**, 1035.
 Triethylic formate, **7**, 227.
 Triethylphosphine, **11**, 61.
 — action of allyl sulphocyanate upon,
 13, 315.
 — action of benzylene dichloride on,
 14, 313.
 — action of ethylene dibromide on,
 14, 76.
 — action of ethylene dichloride on,
 14, 316.
 — action of ethylene di-iodide on,
 14, 318.
 — action of hydrochloric and hydro-
 bromic acids on oxide of, **24**, 635.
 — action of phenyl sulphocyanate
 upon, **13**, 309.
 — behaviour of, with cyanates, **13**,
 322.
 — behaviour of, with disulphide of
 carbon, **13**, 304.
 — behaviour of, with mercaptan, **13**,
 302.
 — behaviour of, with sulphide of
 nitrogen, **13**, 302.
 — behaviour of, with the sulpho-
 cyanates of ethyl and ethylene, **13**,
 318.
 — behaviour of, with sulphur-com-
 pounds, **13**, 300.
 — behaviour of, with sulphuretted
 hydrogen, **13**, 301.

- Triethylphosphine, preparation of, **13**, 290.
 — preparation and properties of the oxide of, **24**, 629.
 — reduced by sodium from the sulphide but not from the oxide, **13**, 303.
 Triethylphosphine biselenide, **11**, 71.
 Triethylphosphine bisulphide, **11**, 69.
 Triethylphosphine chloride, bromide and iodide, **11**, 69.
 Triethylphosphine oxide, **13**, 293.
 — compound of, with iodide of zinc, **13**, 296.
 — compound of, with platinum chloride, **13**, 298.
 Triethylphosphine oxychloride, **13**, 299.
 Triethylphosphonium, hydrate of vinylated, **14**, 327.
 Triethylphosphonium sulphocyanate: its deportment under the influence of heat, **13**, 321.
 Triethylsilicic acid, chloride of, **24**, 918.
 Triethyl-silicic acid, **25**, 156, 609.
 Triethylsulphine, periodide of, **24**, 930.
 Triethyl-sulphyl, **17**, 105.
 Triethyl-toluyllammonium, oxide of, **7**, 73.
 Triglycerides, **12**, 244.
 Triglycollamic acid, **24**, 361.
 — constitution of, **24**, 236.
 Trigonal pyramids, law of, in circular polarising substances, **24**, 1180.
 Tri-iodide of berberine, **15**, 352.
 Tri-iodides of the alkaloids, **24**, 399.
 Tri-iodoscin, **17**, 327.
 Triurazarin, **7**, 283.
 Trimetalarsides, **12**, 93.
 Trimetalphosphides, **12**, 92.
 Trimetalstibides, **12**, 93.
 Trimethyl-acetic acid, **25**, 1092.
 Trimethylamine, action of, on bromide of bromethyl-triethylphosphonium, **14**, 331.
 — existence of, in the brine of salted herrings, **5**, 288; **7**, 63.
 Trimethyl-carbinol, **24**, 1035.
 — conversion of isobutyl alcohol into, **25**, 475.
 — inverse formation of isobutyl alcohol from, **25**, 478.
 Trimethyl-ethyl-formene, **25**, 1092.
 Trimethyl-ethylphosphonium iodide, **11**, 75.
 Trimethyl-phenyllammonium iodide, action of heat on, **25**, 1022.
 Trimethylphosphine, **11**, 73; **13**, 323.
 — action of, on bromide of bromethyl-triethylphosphonium, **14**, 319.
 — action of dibromide of ethylene on, **14**, 320.
 Trimethyl phosphine binoxide, bisulphide and biselenide, **11**, 74.
 Trimethylphosphonium, platinum-salt of, **11**, 75.
 Trimethylstibine, action of zinc-methyl on biniodide of, **13**, 119.
 Trinitranisol, **3**, 75.
 Trinitro-albumin, **25**, 1028.
 Trinitroglycerin, **17**, 158.
 Trinitronaphthalene, **25**, 700.
 Trinitro-orenic acid, **24**, 358.
 Trinitro-oxybenzoic acid, **18**, 309.
 Trinitrophenic or pieric acid, **14**, 243.
 Trinitro-resorcinic acid, **24**, 358.
 Trinkerite, **24**, 1179.
 Triolein, **7**, 282.
 Trioxide type, **16**, 284.
 Tripalmitin, **7**, 283.
 Triphenyl-biuret, **24**, 395.
 Triphenyl-guanidine, action of cyanogen on, **24**, 143.
 Tristearin, **7**, 283.
 Trisulphate of copper, **1**, 222.
 Trisulphide of antimony, reaction of, with sodium sulphide, **25**, 43.
 Trisulphide of ethyl, **24**, 905.
 Trisulphodiphenylenic acid, **20**, 101.
 Trisulphoxazate of potassium, **24**, 308, 660.
 Trithallous phosphate, **25**, 988.
 Trithionic acid, formation of, **24**, 658.
Triticum repens, or couch grass, constituents of the rhizomes of, **25**, 840.
 — supposed existence of mannite in the roots of, **11**, 139.
 Trityl-hydrate, **6**, 287.
 Trityl-sulphocarbonic acid, **6**, 288.
 Trivalerin, **7**, 282.
 Tube atmolyser, **17**, 355.
 Tubes, method of adopting wide to narrow, **25**, 527.
 Tungstates, specific heat of, **17**, 200, 227.
 Tungsten, amidogen-compounds of, **3**, 171.
 — atomic weight of, **25**, 287.
 — compounds of, **25**, 286.
 — its effect in increasing the power of steel to retain magnetism, **21**, 284.
 — separation of, from niobium and tantalum, **25**, 193.
 — specific gravity and atomic volume of, **11**, 61.
 Tungsten amido-nitride, **3**, 172.
 Tungsten oxyamido-nitride, **3**, 174.
 Tungsten phosphide, **5**, 94.
 Tungstic acid, separation of crude, into three distinct acids, **5**, 95, 96.
 Tungstic acid, liquid, **17**, 325.

Tungstic acid, specific gravity and atomic volume of, III, 83.
 Tunicata, occurrence of chondrigen in, **25**, 309.
 Tunicin, **25**, 1000.
 Turneric, colouring matter of, **24**, 152.
 — detection of, in powdered rhubarb and yellow mustard, **24**, 761.
 Turnerite, **24**, 324.
 Turnip, common white garden, analysis of, **2**, 14.
 — Swede or "Ruta-baga," analysis of, **2**, 15.
 Turnips, effect of arsenious acid in the soil on the growth of, **14**, 224.
 Turpentine, constitution of, **25**, 141.
 — essence of, **4**, 135.
 — laurel, analysis of, **1**, 45.
 — laurel, hydrate of the oil of, II, 121.
 Turpentine oil, **17**, 14.
 — — absorption of its vapour by charcoal, **20**, 163.
 — — cymene from, **25**, 293, 440, 1008.
 — — production of cymene from hydrate of, **25**, 240.
 — — specific gravity and expansion of, by heat, **25**, 5.
 Turpentine oil and caoutchou, comparative experiments on the action of bromine on, **15**, 117.
 Tutu plant (*Coriaria ruscifolia*), poisonous principle of, **24**, 152.
 Twelve-carbon ether, **6**, 316.
 Two-liquid battery, observations on the, **25**, 664.
 Types, chemical, **16**, 257, 274.
 Types, theory of, **22**, 346.
 Typical formulae, use of, **13**, 246.
 Tyrian purple, **14**, 232.
 Tyrosine, **25**, 709, 896.
 — action of ethyl iodide on, **22**, 291.
 — action of nitric acid on, **22**, 286.
 — action of nitrous acid on, **22**, 290.
 — action of reducing agents on, **22**, 291.
 — chromium-compound of, **22**, 278, 292.
 — compounds of, with mercury, **24**, 406.
 — compounds of, with mercuric and mercurous nitrates and mercurous nitrite, **22**, 283.
 — constitution and reactions of, **22**, 277.
 — formation of, in alcoholic fermentation, **25**, 260.
 — formation of, by heating casein with glacial acetic acid, **24**, 733.
 — general considerations on, **22**, 291.

Tyrosine, oxidation of, by bichromate of potash and dilute sulphuric acid, **22**, 277.
 Tyrosine reaction, Hofmann's, **24**, 406.

U.

Uhuamite, **24**, 1179.
 Umic acid from brown peat, **25**, 521.
 Ultramarine, action of moist, on silver, **24**, 970.
 — blue-burning of, direct from the raw mass, **25**, 349.
 — constitution of, **24**, 166.
 — notes on, **24**, 970.
 — supposed incapability of potash to form, **24**, 451.
 Umbelliferone, **24**, 832.
 Umbilical cord, mucous tissue of the, **25**, 311.
 Uniatonic metals, peroxides of, **16**, 290.
 Uranidobenzoate, ethylic, **25**, 81.
 Uranidobenzoic acid, derivatives of, **25**, 497.
 Uranidodinitrophenylic acid, **25**, 712.
 Uranidodraeylic acid, **25**, 711.
 Uranic acetate, double salts of, **25**, 401.
 Uranic hydrate, specific gravity and atomic volume of, III, 83.
 Uranic oxide, basicity of, **24**, 199.
 Uranic sucrate, dialysis of, **15**, 254.
 Uranite from Cornwall, **25**, 1055.
 Uranite, production of artificial, **1**, 38 (p).
 Uranium, modification of the reactions of, by citric acid, **10**, 114.
 Uranium oxide, separation of, from iron oxide, **25**, 178.
 Uranium residues, method of working up, **24**, 586.
 Uranium salts, osmose of, **8**, 91.
 Uranium selenites, **2**, 68.
 Uranium solution, titration of phosphoric acid by, **24**, 753.
 Uranium, specific gravity of, III, 72.
 Uranoso-uranic oxide, specific gravity and atomic volume of, III, 83.
 Uranous oxide, specific gravity and atomic volume of, III, 83.
 Urate of thallium, **17**, 151.
 Urates, artificial, formation of compounds of the, which are decomposed when washed with water, **15**, 209.
 Urates, composition of the amorphous deposit of, in healthy urine, **15**, 201.
 Urea, action of liquid phosgene on, **25**, 718.

- Urea, action of nitrous acid on, in aqueous solution, **24**, 265.
- action of potassium permanganate on, in strongly alkaline solutions, **21**, 25.
- analysis of, **1**, 229.
- artificial formation of, from fulminic acid, **1**, 228.
- base isomeric with, **25**, 500.
- compounds of, and method for the determination of sodium chloride and of urea in urine, **6**, 1.
- compounds of, with mercuric oxide, **6**, 2—4.
- compound of, with silver oxide, **6**, 4.
- direct conversion of ammonia carbamate into, **21**, 194.
- estimation of, **1**, 420.
- estimation of, by sodium hypobromite, **24**, 162.
- estimation of, in urine, **6**, 18.
- estimation of, in urine containing chloride of sodium, **6**, 25.
- formation of, from albuminoid matters by the action of potassium permanganate, **25**, 157.
- formation of, in animal bodies, **25**, 833, 1033.
- Liebig's method of estimating the quantity of, in urine, **5**, 30.
- a normal constituent of bile, **24**, 423.
- origin of, in animal bodies, **25**, 834.
- oxidation of, by potassium permanganate, **21**, 28.
- preparation of, **21**, 63.
- preparation of solution of mercury for the precipitation of, in urine, **6**, 21.
- production of, by the decomposition of aqueous hydrocyanic acid, **24**, 1067.
- rational formula of, **21**, 31.
- Urea and chlorides, estimation of, in urine, in presence of potassium iodide, **25**, 1124.
- Urea nitrate, action of, on benzylic alcohol, **24**, 928.
- compounds of, with mercuric oxide, **6**, 5—7.
- Urea, piperidic, **6**, 177.
- Ureas, benzylic, **24**, 928; **25**, 448.
- Ureas, compound, **8**, 158.
- Ureas considered as diamines, **11**, 262.
- Ureas (sulphur-), **24**, 570.
- Ureids, synthetical researches on, **25**, 249.
- Urethane, butylic, **8**, 276.
- Uric acid, chemical history of the products of the decomposition of, **11**, 9.
- Uric acid, estimation of, **25**, 112, 333, 844, 929, 1123.
- Uric acid group, researches on the, **24**, 1058; **25**, 423.
- Uric acid, neutral salts of, **1**, 343.
- Uric oxide, or xanthine, solubility of, in dilute hydrochloric acid, **21**, 211, 835.
- Urinary calculi, **24**, 848.
- Urinary colouring matter, artificial conversion of bilirubin into, **25**, 514, 835.
- Urinary pigments, **24**, 419.
- Urine: is the absolute amount of acid in it greater on a day of exertion than on a day of rest? **25**, 637.
- action of cupric sulphate on normal, **25**, 1033.
- Brücke's processes for the detection of sugar in, **14**, 32.
- changes which organic substances suffer on their passage into the, **1**, 421.
- composition of, **25**, 315.
- composition of the amorphous deposits in healthy, **15**, 467.
- decomposition of the ordinary amorphous sediment in, by washing with water, **15**, 206.
- deposit of crystallised xanthine in human, **15**, 78.
- detection of iodine in, in the state of potassium iodide, **25**, 1124.
- detection of sugar in healthy, by Brücke's alcohol process, **14**, 36.
- detection of sugar in healthy, by Brücke's lead process, **14**, 37.
- detection of sugar when added to healthy, **14**, 22.
- detection of sugar naturally present in healthy, **14**, 35.
- estimation of potash in, by tartaric acid, **25**, 1124.
- estimation of the amount of sugar present in healthy, **14**, 40.
- estimation of sugar and detection of albumin in, **24**, 1095.
- method of estimating a minimum amount of sugar in, **25**, 636.
- estimation of urea and chlorides in, in presence of potassium iodide, **25**, 1124.
- optical rotation in healthy, **14**, 39.
- preparation of creatine hydrochloride from, **24**, 942.
- preparation of a fixed manure from, **11**, 302.
- quantities of ammonia evolved from, by potash and by potassium permanganate, **25**, 696.
- sarcosylactic acid in, **24**, 423.
- simultaneous variations of hippuric and uric acid in healthy, **15**, 81.

Urine, specific gravity of, as a measure of its solid constituents, **16**, 25.
 — sugar in, **14**, 22.
 — is sugar a normal constituent of? **25**, 634.
 — a violet deposit in, **25**, 157.
 Urine of the goat, composition of, on a purely vegetable or purely animal diet, **25**, 898.
 Urine of herbivora, formation of hippuric acid in the, **25**, 835.
 Urine of the heron, guanine in, **24**, 848.
 Urine, human, acetic and formic acid obtained from, during the chemical decomposition of urochrome, **23**, 400.
 — — occurrence of deposits of crystallised phosphate of lime in, **15**, 8.
 — — researches on the physiological variations of the quantities of hippuric acid in, **17**, 55.
 — — kryptophanic acid, a normal ingredient of, **23**, 116.
 Urine in leukæmia, **24**, 421.
 Urine of men and dogs, succinic acid in the, **25**, 257.
 Urosulphuric acid, **25**, 423.
Ursus spelæus, proportion of ordinary to soluble ossein in a bone of, **24**, 734.

V.

Vaccinium Myrtillus, fermentation of the berries of, **25**, 906.
 Vacuum, method of obtaining a perfect, in the receiver of an air-pump, **5**, 189.
 — Sprengel's researches on the, **18**, 9.
 Vacuum-pan of a sugar-factory, effect of certain methods of boiling in the, **25**, 1136.
 Vacuum-tube, transference of gases by, **20**, 246.
 Valeraldehyde, **9**, 189; **24**, 539, 706.
 Valeraldehyde-ammonia, **24**, 707.
 Valeraldine, **24**, 706.
 Valeramine, formation and preparation of, **3**, 95.
 Valeramine chloroplatinate, **3**, 95.
 Valeramine hydrochloride, **3**, 96.
 Valeramilide, **6**, 185.
 Valerate of allyl, **10**, 322.
 Valerate of amyl, oxidation of, **19**, 485.
 — — preparation of, by oxidation of amyl alcohol, **24**, 902.
 Valerate of ethyl, capillary transpiration of, **15**, 439.

Valerate of sodium, action of bromine on, in aqueous solution, **22**, 187.
 Valerate of thallium, **17**, 151.
 Valerates, normal, **24**, 1045.
 Valerene, **3**, 44.
 Valerianic acid. See Valeric Acid.
 Valeric acid, absorption of its vapour by charcoal, **20**, 163.
 — — action of heat on, **3**, 121.
 — — action of nitric ethers on, in presence of sulphuric acid, **22**, 190.
 — — capillary transpiration of, **15**, 434.
 — — compounds of, with glycerin, **6**, 285.
 — — electrolysis of, **2**, 158.
 — — formation of, by oxidation of amylamine, **19**, 488.
 — — formation of, by oxidation of amyl acetate, **19**, 485.
 — — formation of, by oxidation of amyl alcohol, **19**, 483.
 — — formation of, by oxidation of amyl iodide, **19**, 486.
 — — formation of, by oxidation of amyl valerate, **19**, 485.
 — — formation of, by oxidation of oleic acid, **11**, 240.
 — — transformation of, **15**, 141.
 — — from various sources, **25**, 242.
 — — isomorphism of, **21**, 74.
 — — metaldehyde of, **8**, 157.
 — — normal, **24**, 1043.
 — — preparation of leucine from the aldehyde of, **8**, 157.
 Valeric acids, on the different, **24**, 126.
 Valeric benzoate, or benzoic valerate, **6**, 185.
 Valeric coumarin, **21**, 58.
 Valerins, **6**, 285.
 Valerone, **25**, 892.
 Valeryl, liberation of, by the action of sodium on valerate of ethyl, **17**, 371.
 Valeryl peroxide, **17**, 276.
 Valeryl urea, **8**, 160.
 Valonia, examination of, **1**, 139.
 Valyl, **2**, 160.
 Vanadate of bismuth (native), **25**, 131.
 Vanadates, metallic, **21**, 339; **24**, 28.
 Vanadates, order of stability of, **24**, 36.
 Vanadates, ortho-, reactions of, **24**, 31.
 Vanadates of calcium, **24**, 32.
 Vanadates of lead, **24**, 33, 500.
 Vanadates of silver, **24**, 35.
 Vanadates of sodium, **24**, 29.
 Vanadic acid, **21**, 339.
 Vanadic acid in a salt deposited from the mother-liquors obtained in the manufacture of soda, **25**, 661.

- Vanadic acid, volumetric estimation of, **8**, 232.
- Vanadinite, **24**, 502.
- Vanadinite, artificial, **24**, 34.
- Vanadinite from South Africa, **23**, 1053.
- Vanadium, researches on, by H. E. Roscoe, **21**, 322; **23**, 344; **24**, 23.
- action of, on glass and porcelain, **23**, 358.
- action of iodine on, **24**, 28.
- determination of, in soluble vanadates, **24**, 28.
- occurrence of, in pig-iron smelted from the Wiltshire oolitic iron ore, **17**, 21.
- occurrence of, in trap-rocks, **25**, 1116.
- Vanadium compounds, occurrence and preparation of, **21**, 326.
- Vanadium dichloride, **23**, 350.
- Vanadium dioxide, **21**, 331.
- Vanadium, metallic, **20**, 252; **24**, 23.
- Vanadium minerals, phosphorus in, **21**, 329.
- Vanadium mononitride, **23**, 344.
- Vanadium nitrides, **21**, 349.
- Vanadium ochre and other sources of vanadic acid, **16**, 244.
- Vanadium oxychlorides, **21**, 311.
- Vanadium oxydibromide, **24**, 26.
- Vanadium oxytribromide, **24**, 24.
- Vanadium pentoxide, **21**, 339.
- Vanadium tetrachloride, **23**, 345.
- action of bromine on, **23**, 349.
- Vanadium tetroxide, **21**, 338.
- Vanadium tribromide, **24**, 26.
- Vanadium trichloride, **23**, 349.
- Vanadium trioxide, **21**, 336.
- Vanadyl, **21**, 334.
- Vanadyl dibromide, **24**, 26.
- Vanadyl dichloride, **21**, 347.
- Vanadyl monochloride, **21**, 348.
- Vanadyl tribromide, **24**, 24.
- Vanadyl trichloride, **21**, 341.
- Vanillic acid, **25**, 708.
- Vapour, vesicular, **25**, 667.
- Vapour of water, spectrum of, **25**, 289.
- Vapour-densities, **18**, 89.
- comparison of different methods of determining, **23**, 323.
- modification of Dumas' method of taking, **15**, 149.
- modification of Gay-Lussac's method of taking, **15**, 143.
- of certain organic compounds of high boiling point, **25**, 295.
- of volatile liquids, mode of taking the, at temperatures below the boiling point, **15**, 142.
- Vapour-density of alcohol, **15**, 145, 146, 153.
- of aqueous ammonia, **15**, 160.
- of ethyl nitrate, **15**, 153.
- of nitric acid, **15**, 154.
- of peroxide of nitrogen, **15**, 156.
- Vapour-density determinations, tables for the calculation of, **19**, 72; **23**, 331—337.
- Vapours, absorption of, by charcoal, **18**, 285; **20**, 160; **21**, 186.
- apparatus for submitting, to the electric discharge, **25**, 970.
- latent heat of, **1**, 27.
- Vapours, metallic, reversal of the lines in the spectra of, **24**, 1142.
- Vapours, mixed, absorption of, by charcoal, **23**, 73.
- Vapour-tension of formate of ethyl and of acetate of methyl, **21**, 477.
- Vapour-volume, simplest method of ascertaining molecular weight by, **25**, 782.
- Variscite, **24**, 1015.
- Varcite, specific gravity and atomic volume of, **11**, 80.
- Vegetable dyes, certain general relations of yellow, **13**, 327.
- Vegetable fibres, silk, and wool in mixed tissues, processes for distinguishing and separating, **25**, 1114.
- Vegetable infusions, action of oxygen on, **25**, 940.
- Vegetable mould, influence of, on the porosity of soils, **25**, 839.
- Vegetable parchment, preparation of, **24**, 861.
- Vegetable parchment used as dialyser, **15**, 220.
- Vegetable principles, **1**, 443.
- Vegetable products from India, examination of, **19**, 226.
- Vegetable proteins, leucine obtained from, **24**, 749.
- occurrence of aspartic and glutamic acids among the decomposition-products of, **24**, 721.
- Vegetable substances, incineration of, **24**, 855.
- reduction of ferric salts by, **11**, 120.
- Vegetable tallow, investigation of the, from a Chinese plant, the *Stillingia sebifera*, **8**, 1.
- Vegetables, action of nitric acid on various, **4**, 213.
- Vegetables, inorganic substances in the ashes of, **11**, 182.
- Vegetables, nitrogenated principles of, as sources of artificial alkaloids, **3**, 309.

- Vegetables, esculent, analysis of the ashes of, **2**, 4.
- Vegetables, herbaceous, metamorphoses and migrations of the proximate principles in, **2**, 4, 577.
- Vegetation, action of atmospheric nitrogen in, **25**, 164.
- action of potassium in, **25**, 164.
- influence of various colours on, **25**, 261.
- injurious influence of the fumes from smelting works and coal fires on, **25**, 1109.
- sources of the nitrogen of, **16**, 100.
- Vegeto-alkali in gun-cotton, **111**, 287.
- Veneers, colouring of, **25**, 187.
- Ventilation, chemical and physical methods of determining the amount of, **10**, 260.
- Verantin, **5**, 60, 61; **12**, 13.
- Veratrine, **25**, 829.
- Verbena, oil of, **17**, 14.
- Vermilion, manufacture of, **2**, 4, 170.
- Verdigris, **7**, 99.
- Vesuvius, condition of, in 1869, **25**, 884.
- Vetch-seed, composition of, **25**, 840.
- Vetches, formation of asparagine in, **25**, 516.
- Vibrating flames, sounds of, **25**, 219.
- Vinegar, wood- and brandy-, preparation of pure acetic acid from, **5**, 274.
- Vinobutyl ether, **8**, 269.
- Vinocacodyl, or arsenbiethyl, **7**, 261.
- Vinyl-compounds, **25**, 890.
- Vinyl-piperidine, **2**, 4, 1063.
- Vinyl-triethylarsonium, compounds of, **1**, 4, 337.
- Vinyl-triethylphosphonium, hydrate of, **1**, 4, 327.
- Vinyl-triethylphosphonium, salts of, **1**, 4, 88.
- Violet, chinoline-, **1**, 4, 216.
- Violet deposit in urine, **25**, 157.
- Violine, **1**, 4, 235.
- dyeing of silk with, **1**, 4, 250.
- dyeing of wool with, **1**, 4, 251.
- Viridine in tobacco smoke, **2**, 4, 1077.
- Vitiver, essential oil of, **25**, 3.
- Vitiver-oil, hydrocarbon from, **25**, 6.
- Vitriol-oil, heat evolved in the hydration of, **1**, 107.
- action of, on ferrocyanide of potassium, **1**, 251.
- Vivianite, **2**, 4, 6.
- Voids, human, amount of nitrogen, reckoned as ammonia, and estimated value of total constituents in, **19**, 96.
- Volatile oils obtained in the distillation of wood, **3**, 183.
- Volcanic dust, examination of rain accompanied by, **25**, 1082.
- Voltaic action, observations on clean and unclean surfaces in, **2**, 4, 990.
- Voltaic action, some cases of, **1**, 142.
- Voltaic arrangements, employment of chromic acid as an agent in, **1**, 61.
- Voltaic batteries, measurement of the internal resistance of, by the compensation method, **2**, 4, 649.
- Voltaic batteries, most economical arrangement of, with regard to their polar electrodes, **25**, 109.
- Voltaic battery, action of the secondary currents of, on the primary currents, and on one another, **2**, 4, 884.
- Voltaic battery, on a coal-gas carbon and nitric acid, **9**, 198.
- Voltaic battery elements, **25**, 120.
- Voltaic battery, influence exerted in the, by the size of the plates, **2**, 4, 881.
- Voltaic battery, use of potassium permanganate in the, **25**, 279.
- Voltaic couple immersed in pure water and in oxygenated water, experiments with, **111**, 280.
- Voltaic couples, experiments with, **2**, 97.
- Voltaic couples, experiments with, immersed in pure water and in oxygenated water, **1**, 12.
- Voltaic current, estimation and separation of several metals by the, **25**, 174.
- Voltaic current, decomposition of valerianic acid by the, **111**, 378.
- Voltaic element of economical application, **25**, 971.
- Voltaic element, measurement of polarisation in a, **25**, 381.
- Voltaic elements, apparatus for the convenient arrangement of certain combinations of, **2**, 4, 884.
- Voltaic energy, analysis effected by the employment of, **25**, 113.
- Voltaic energy, thermic researches on, **2**, 4, 1131, 1136.
- Volume, change of, accompanying solution, **25**, 217.
- Volume, changes of, produced in chemical combination, **2**, 4, 975.
- Volume of liquids, measurement of, **19**, 455.
- Volumes, atomic, and boiling points of analogous organic liquids, **1**, 363.
- Volumes, specific, chemical composition, and boiling points, relation between, **3**, 104.
- Volumetric analysis, method of, of very general application, **8**, 219.
- Volumetric analysis, sources of error in, **2**, 4, 156.
- Volumetric changes which occur when oxygen contracted by the electric dis-

charge, is brought in contact with other bodies, **13**, 352.
 Volumetric estimation of atmospheric carbon acid, **10**, 292.
 Volumetric estimation of sulphuric acid, baryta, chlorine, bromine, and iodine, **24**, 436.
 Volumetric method for the determination of copper, **10**, 65.
 Volumetric relations of ozone, **13**, 344.
 Volumetric test-solutions, adjustment of, **25**, 1113.
 Vulcanized india-rubber tubing, penetration of gases by, **20**, 249.

W.

Washing bottle, description of a self-acting, **9**, 200.
 Water, absorption of ammonia and air in, **17**, 90.
 — absorption of ammonia and hydrogen in, **17**, 98.
 — absorption of chlorine in, **8**, 14.
 — absorption of hydrochloric acid and ammonia in, **12**, 128.
 — absorption of ozone by, **25**, 785.
 — absorption of sulphurous acid in, **14**, 2.
 — absorption of sulphurous acid and carbonic acid in, **17**, 98.
 — action of, on antimonious chloride, **24**, 662.
 — action of heat on ferric hydrate, in presence of, **19**, 69.
 — action of, on iron, **24**, 103.
 — action of, on proteids, **24**, 731.
 — action of sulphur on vapour of, **25**, 220.
 — action of zinc on iodide of ethyl, in presence of, **2**, 288.
 — amount of, displaced from the hydrates of potassium, sodium, and barium, by boracic and silicic acids, **14**, 143.
 — amount of combined, in certain couple sulphates, **25**, 225.
 — amount of combined, in ferrous sulphate precipitated by alcohol, **25**, 225.
 — amount of nitrates in spring, brook, river, and lake, **25**, 786.
 — atomic volume of, **III**, 160.
 — charged with hydrogen dioxide under the influence of a freezing mixture, action of potassium permanganate upon, **25**, 921.
 — chemical action of, on soluble salts, **11**, 36.
 — chemical quality of the supply of, to the metropolis, **4**, 375.

Water, combinations of sulphurous acid with, **1**, 383.
 — decomposition of, by platinum and magnetic iron oxide at a white heat, **III**, 332.
 — decomposition of, by zinc, in conjunction with a more negative metal, **25**, 461.
 — estimation of combined carbonic acid, **25**, 524.
 — estimation of the hardness of, **1**, 8 (p).
 — experiments with galvanic couples immersed in pure, and oxygenated, **III**, 380.
 — for feeding boilers, analysis of, **24**, 762.
 — freezing of, **21**, 71; **24**, 795; **25**, 976.
 — decomposition of, during alcoholic fermentation, **25**, 577.
 — hardness of, temporary and permanent, **4**, 381.
 — heat developed by friction of, **3**, 319.
 — ice found beneath the surface of the, in rivers, called "ground ice," **14**, 111.
 — influence of, in chemical reactions, **1**, 15 (p).
 — maximum density of, **III**, 199.
 — method of demonstrating the composition of, **18**, 164.
 — organic matter in, **23**, 371.
 — products of decomposition of neutral sulphate of ethyl with, **1**, 397.
 — protective action of, on gum-cotton, **20**, 554.
 — pure, solubility of lead oxide in, **II**, 399.
 — the question whether any comparative inconvenience would arise from a supply of soft water to the metropolis with the present system of distribution, **4**, 400.
 — reactions of, **24**, 492.
 — relation between decomposition and electrostatic induction of, **24**, 101.
 — softening of, with lime, **25**, 972.
 — softening process for, **8**, 104.
 — solubility of ammonia in, **14**, 17.
 — solubility of bromine in, **15**, 487.
 — solution of gases in, **23**, 36.
 — state of combination of carbonic and silicic acids in, **25**, 525.
 — supply of, to the metropolis during the year 1865-1866, **19**, 239.
 — supply of, to the metropolis, improvement of the, **4**, 392.
 — supply of, to the metropolis, recommended by the Board of Health, **4**, 396.
 — tables of solubility of sulphurous

- acid in, at different pressures and temperatures, **1-4**, 11, 15.
- Water, acid feed, from the coal-field of Stellarton, Nova Scotia, and the results of its use, **23**, 155.
- Water, acidulous chalybeate, from Melrose, **25**, 60.
- Water of the artesian well, Southampton, analysis of the, **4**, 7.
- Water of the artesian wells, Trafalgar-square, analysis of the, **1**, 97.
- Water of a spring at Billingborough, Lincolnshire, analysis of the, **12**, 57.
- Water of Bonnington, analysis of, **11**, 201.
- Water of Bonnington, quantitative analysis of the soluble and earthy ingredients in, **11**, 206, 211.
- Water, chalybeate, of Cambray, **1**, 195.
- Water supplied by the Chatham Water Company to Fort Pitt, analysis of **15**, 474.
- Water of Cheltenham, **1**, 193.
- Water of Christian Malford, near Chippenham, analysis of, **13**, 80.
- Water from the coal measures of Westville, Nova Scotia, **2-4**, 176.
- Water of crystallisation in salts, estimation of, by Hofmann's vapour-density method, **2-4**, 707.
- Water of the Dead Sea, analysis of the, **2**, 336.
- Water, composition of the, of the Dee and Don, at Aberdeen, with an investigation into the action of Dee water on lead pipes and cisterns, **4**, 123.
- Water of the deep wells in the chalk under London, source of the, **9**, 21.
- Water of drainage, composition of, from plots of land differently manured, **2-4**, 286, 291.
- Water of drainage, solvent action of, on soils, **III**, 219.
- Water, analysis of deep-well, from Messrs. Holt's Brewery, Ratcliffe, **3**, 1.
- Water, deep well, of the London basin, existence of phosphoric acid in the, **11**, 392.
- Water of Farnham and Surrey, analysis of, **4**, 397.
- Water from Gravesend Waterworks, analysis of, **4**, 409.
- Water supplied by the Hampstead Waterworks Company, analysis of the, **2**, 32.
- Water of the Holy Well at Humphrey Head, North Lancashire, analysis of, **21**, 19.
- Water of Holy Well, North Wales, analysis of, **12**, 52.
- Water of hydration, volumes occupied by certain salts containing a large amount of, **11**, 412.
- Water of hydration, optical evidence of the nature of, **2-4**, 183.
- Water of hydration, sulphates with a small proportion of, **11**, 427.
- Water of the Irish Sea, **2-4**, 506.
- Water of irrigation canals, nitrous acid in, **2-4**, 950.
- Water, medicinal, from the neighbourhood of Bristol, analysis of, **2**, 200.
- Water of the Mint, analysis of the, **2**, 345.
- Water selected for the supply of the metropolis, properties to be preferred in the, **4**, 410.
- Water, New River, East London, Kent, and Hampstead, analysis of, **4**, 378, 379.
- Water supplied by the New River and East London Companies from River Lea, properties of, **4**, 386.
- Water from a pump at Fort Pitt, analysis of, **15**, 475.
- Water of the Rhine, near Köln, **2-4**, 213.
- Water, river and spring, influence of, on meadow grass, **25**, 518.
- Water, saline, at Overton, near Swindon, North Wilts, analysis of, **1-4**, 43.
- Water, strong saline, **1**, 204.
- Water, sulphuretted saline, **1**, 200.
- Water, sea-, analysis of, **23**, 16.
- Water, sea-, presence of lead, copper, and silver in, **3**, 68.
- Water, soft, action of, on lead, **4**, 401.
- Water of the Thames, analysis of the, **1**, 155; **2**, 74; **4**, 379, 380.
- Water of the Thames at Greenwich, analysis of the, **2**, 195.
- Water of the Thames, properties of, **4**, 376, 383.
- Water from the Thames and Lea, average hardness of, **4**, 387.
- Water of the thermal spring of Bath, analysis of the, **III**, 262.
- Water of Tunbridge Wells, analysis of, **10**, 223.
- Water proposed to be supplied from Watford, **4**, 404.
- Water and air of towns, **III**, 311.
- Water and alcohol, relative expansions of mixtures of, under the influence of a certain rise of temperature, and on a new instrument for taking the specific gravities of the same, **2**, 224.
- Water and certain alcohols insoluble in water, simultaneous distillation of, **2-4**, 1029.
- Water and ammonia, combination of, with carbonic anhydride, **23**, 171.
- Water and carbonic acid, formation of organic substances from, **17**, 40.
- Water, ethers, and acids, critical observations on Williamson's theory of, **7**, 111.

- Water and oxygen, atomic weights of, **11**, 107.
- Water air-pump, **25**, 1067.
- Water-analysis with the "hydrotimeter," **24**, 582.
- — simple apparatus for determining the gases incident to, **21**, 169.
- — sulphuric acid estimation in, **24**, 439.
- Water-culture experiments with maize, **24**, 1081.
- Water-glass, neutral, use of, for wool washing, **24**, 860.
- Water-glass, use of, in soap-making, **25**, 340.
- Water-holding power of soil and soil-constituents, **25**, 522.
- Watering streets with saline solutions, **24**, 968.
- Water-plants, influence of light and heat on the evolution of oxygen by, **24**, 1080.
- Waterproofing of cloth and other material, **25**, 858.
- Waterproofing of linen and cotton, **24**, 767.
- Waterproof-paper, adaptation of the solubility of cellulose in ammoniacal copper solution to the preparation of, **25**, 1137.
- Waters, determination of the temporary hardness of, **25**, 323.
- existence of copper in certain, **24**, 1096.
- experiments on the dangers arising from the use of certain, for feeding steam-boilers, **15**, 32.
- quantity of free ammonia and albuminoid ammonia in different, **20**, 454.
- volumetric process for the analysis of, **15**, 468.
- Waters from the deep wells in Westbourne-park and Russell-square, and the Hanwell Lunatic Asylum, analysis of, **6**, 115.
- Waters, distilled, of the pharmacopœias, **11**, 261.
- Waters, hard, objection to, for domestic use, **4**, 388, 392.
- Waters in India, examination of, **25**, 1044.
- Waters supplied by the eight principal London companies, hardness of, **4**, 382.
- Waters of the metropolis during the autumn and winter of 1854, chemical composition of the, **8**, 97.
- Waters, mineral, from the cold springs of the Euganean Hills, Padua, **24**, 1021.
- Waters, mineral, from Forge-les-Eaux, erenic and apocrenic acid in, **24**, 921.
- — of Nengaroezi, near Halle, **24**, 212.
- Waters from the Mudlump Springs of the Mississippi Passes, analyses of, **24**, 676.
- Waters, muddy, clearing of, **24**, 868.
- Waters, natural, apparatus for determining the quantity of gases existing in solution in, **22**, 307.
- Waters, potable, alterations in, **25**, 387.
- — analysis of, **21**, 77.
- I. Estimation of total solid constituents, **21**, 78, 87.
- II. Estimation of organic and other volatile matter, **21**, 79.
- III. Determination of oxygen necessary to oxidise the organic matter, **21**, 81.
- IV. Estimation of nitrous and nitric acids, **21**, 85, 101.
- V. Estimation of ammonia, **21**, 87, 103.
- VI. Estimation of organic carbon and nitrogen, **21**, 87.
- Waters, potable, analysis of, by a titrated soap-solution, **25**, 842.
- — determination of the quality of, **25**, 334.
- — development of fungi in, **24**, 66.
- — estimation of nitric acid in, **21**, 172; **25**, 922.
- — estimation of organic matter and nitric acid in, **24**, 754.
- — examination of the amount of organic matters in, by means of a standard solution of permanganate of potash, **16**, 62.
- — origin of nitrates in, **24**, 62.
- — some points in the analysis of, **18**, 117.
- Water-type, acid derivatives of ammonia constructed upon the, **12**, 94.
- — basic derivatives of ammonia constructed upon the, **11**, 270.
- Water-vapour, absorption of, by charcoal, **18**, 288.
- — passage of, through heated platinum, **20**, 262.
- — spectrum of, **25**, 280.
- Waters fluid, transpiration of, by leaves, **24**, 850.
- Wax, action of alkalis on, **1**, 248.
- formation of, **25**, 639.
- Wax (Canaüba), chemical composition of, **22**, 87.
- Wax of the Chamærops, **111**, 24.
- Wax, Chinese, oxidation of, **5**, 24.

- Wax, Chinese, products of oxidation of, **10**, 166.
- Wax of *Copernicia cerifera*, an alcohol in the, **7**, 192.
- Websterite, occurrence of, near Brighton, **24**, 1179.
- Weight, atomic, and atomic heat, relations between, **19**, 203.
- Weight, decrease and increase of, produced by successive oxidation and reduction, **24**, 188.
- Weights, equivalent, **22**, 331.
- Weights, simple, symbols of, **21**, 397.
- Well, remarkable, at Delft, **24**, 3, 8.
- Well-water, estimation of ammonia in, **25**, 1041.
- Well-water, estimation of phosphoric acid in, **24**, 582.
- Well-water of towns, **25**, 815.
- Well-waters, composition of certain, in the neighbourhood of London, and their action on lead, **4**, 20.
- Well-waters of Bristol, existence of strontia in the, **5**, 193.
- Wheat, alkaloïds obtained from, **3**, 312.
- analysis of the ash of, **11**, 193.
- composition of the ash of hard and soft, **25**, 916.
- specimen of diseased, **11**, 199.
- Wheat-bran, products of the acid fermentation of, **24**, 545.
- Wheat-grain, analysis of the ash of, **10**, 17.
- — composition of the products of, from the Colonial steel hand-mill, **10**, 38.
- — mineral constituents of, from the development of the ovary until over-ripe, **25**, 516.
- — percentage of nitrogen in the dry matter of, grown at Rothamsted, **10**, 10.
- — percentage of nitrogen in mill-products of, **10**, 30.
- — percentage of nitrogen in the products of, from the Colonial steel hand-mill, **10**, 37.
- — on some points in the composition of, its products in the mill, and bread, **10**, 1, 269.
- White blood-corpuscles, alteration of, by quinine, **25**, 254.
- White cast iron, composition of, **25**, 677.
- White clover, composition of the seed-shells of, **25**, 916.
- White of egg (liquid), quantities of ammonia evolved from, by potash and by permanganates, **25**, 646.
- White of egg and milk spots, distinction between, **25**, 646.
- White lead, analysis of, **24**, 762.
- White lead, red coloration of, **25**, 881.
- White mustard seed, new constituent of, **24**, 498.
- Wiltshire oolitic iron ore, occurrence of vanadium in pig-iron smelted from, **17**, 21.
- Wine, chemical examination of some specimens of, from the Rhingau, **1**, 78.
- detection of adulteration of, with fruit-wines, **25**, 272.
- estimation of compound ethers in, **20**, 493.
- estimation of cream of tartar in, **24**, 1211.
- Hungarian, fatty acids in fusel oil of, **24**, 359.
- means of distinguishing grape from fruit, **25**, 815.
- treatment of, with tannin, **25**, 272.
- use of tannin for the preservation of, **24**, 1099.
- Wines, apparatus of Giret and Vinas for heating, with a view to their preservation, **24**, 1100.
- decolorising action of nitric acid on red, **25**, 853.
- examination of German and other, **25**, 530.
- stored, means of removing the acid from, **1**, 413.
- Winkworthite, **24**, 320.
- Winter-green, oil of, **17**, 14.
- Wochlerite, composition of, **25**, 201.
- Wolfram, composition of, **5**, 95.
- Wollastonite from Somma, **25**, 292.
- Woman's milk, analysis of, **25**, 513.
- Wood, alkaloïds obtained from, **3**, 313.
- distillation of, **24**, 1101.
- impregnation of, for use in mines, **25**, 186.
- volatile oils obtained in the distillation of, **5**, 183.
- Wood-pulp, detection of, in paper, **24**, 969.
- Wood-spirit, constitution of, **17**, 222.
- Wool-vinegar, preparation of pure acetic acid from, **5**, 274.
- Woodwardite, a cupric aluminium sulphate from Cornwall, **19**, 130.
- Wool, brilliant green for, **24**, 861.
- coralline printed on, **25**, 1048.
- dyeing amaranth-colour with fuchsine, **24**, 971.
- dyeing of, with aniline purple, violine, roseine, fuchsine, and chino-line colours, **14**, 251.
- Nicholson or alkali blue on, **25**, 1140.
- Wool and silk, application of coal-tar colours to the dyeing of, **14**, 250.

Wool, silk, and vegetable fibres in mixed tissues, processes for distinguishing and separating, **25**, 1144.
 Wool-washing and dyeing, **24**, 1223.
 Wool-washing, use of neutral water-glass for, **24**, 860.
 Woollen stuffs, sulphuring of, **25**, 940.
 Wormwood, oil of, **17**, 11.
 Wounds, Böttger's disinfecting dressing for, **24**, 769.
 Wrought iron, dry process for the estimation of silicon in, **24**, 1212.
 Wulfenite, **24**, 501.

X.

Xanthamide, phenylic, **24**, 267.
 Xanthamylamide, **5**, 142.
 Xanthine, **5**, 57, 58; **12**, 201.
 Xanthine, solubility of, in dilute hydrochloric acid, **21**, 211.
 Xanthine, deposit of crystallised, in human urine, **15**, 78.
 Xanthogenamide, or Xanthamide, **3**, 85.
 Xanthophyllite, occurrence of diamonds in, **24**, 657.
 Xanthorhammin, **13**, 327.
Xanthoræa hastilis, resin of the, **III**, 10.
 Xylene, **24**, 509.
 — conversion of, into xylenol, **25**, 481.
 Xylene (iso or meta), reduction of, **25**, 893.
 Xylene (ortho) from liquid bromotoluene, **25**, 893.
 Xylenes, **25**, 438.
 Xylidine, **3**, 184.
 Xylidines, **25**, 10.
 Xyloëdin, **III**, 312.
 — heat evolved in the formation of, **24**, 873.
 Xylol. See Xylene.
 Xylol cyanate, **24**, 139.
 Xylol-naphthylamine, **25**, 1025.
 Xylol-urethane, **24**, 139.

Y.

Yeast, artificial, preparation of, **1**, 100.
 — assimilation of ammonia by, **25**, 641.
 — cells of, becoming mobile, like monads, **25**, 260.
 — effect of change of soil on the development of, **23**, 399.
 — estimation of the mineral constituents of, **24**, 855.

Yeast, removal of, from wine-casks, **25**, 272.
 Yeast-plant, nutrition of, **24**, 426.
 Yeast-plants, malt and grape, comparative fermentative properties of, **23**, 393.
 Yellow vegetable dyes, certain general relations of, **13**, 327.
 Yolk of the hen's egg, nuclear structures in, **24**, 746.
 Yttria, specific gravity and atomic volume of, **III**, 412.
 Yttrium, determination of, in tantalites and columbites, **25**, 194.
 Yttrium, separation of, from lanthanum and didymium, **24**, 495.
 Yttrium phosphate, **1**, 7 (p).
 Yttrium selenite, **2**, 68.
 Yttrium and cerium metals, separation of, **25**, 194.

Z.

Zea Mays, manufacture of sugar from, **1**, 48 (p).
 Zinc, action of, on a mixture of acetic and pyracemic acids, **16**, 262.
 — action of, on a mixture of amylic iodide and amylic oxalate, **22**, 55.
 — action of, on a mixture of amylic iodide and ethylic oxalate, **22**, 46.
 — action of, upon a mixture of ethylic iodide and amylic oxalate, **22**, 54.
 — action of, upon a mixture of ethylic iodide, methylic iodide, and ethylic oxalate, **22**, 43.
 — action of, upon a mixture of ethylic iodide and methylic oxalate, **22**, 40.
 — action of, on glyoxylic acid, **18**, 201.
 — action of, on iodide of ethyl, **2**, 265.
 — action of, on iodide of ethyl and alcohol, **2**, 291.
 — action of, on iodide of ethyl and ether, **2**, 293.
 — action of, on iodide of ethyl in presence of water, **2**, 288.
 — action of, on iodide of methyl, **6**, 62.
 — action of, on mercuric amyliide, **17**, 32.
 — action of, on mercuric ethide, **17**, 31.
 — action of, on mercuric methide, **27**, 30.
 — action of, on a mixture of methylic iodide and ethylic oxalate, **22**, 38.

- Zinc, action of, on methyl iodide in sealed tubes, **21**, 500.
- action of sugar on, **7**, 199.
- action of sulphuric acid on, **19**, 435, 437.
- estimation of, **24**, 1214.
- estimation of, in galvanised iron, **24**, 159.
- heat of combustion of, **24**, 643, 793.
- heat evolved in the combination of acids with oxide of, **6**, 247.
- modification of the reactions of, by citric acid, **10**, 114.
- in ox-gallstones, **16**, 42.
- preparation of pure, by electrolysis, **25**, 221.
- reaction of, with nitrite of amyl, **20**, 579.
- reflecting power of, for the chemical rays, **17**, 77.
- separation of, from nickel, **24**, 955.
- specific gravity and atomic volume of, **III**, 60, 66.
- specific gravity and atomic volume of melted, **III**, 75.
- symbol of, in Brodie's chemical calculus, **21**, 446.
- volumetric estimation of, **24**, 755 ; **25**, 843.
- volumetric estimation of, by sodium sulphide, **24**, 1215.
- Zinc amalgam, **16**, 384.
- Zinc amylate, **17**, 34.
- Zinc amyliodide, **17**, 35.
- Zinc amylochloride, **17**, 34.
- Zinc anchoate, **10**, 173.
- Zinc arsenite, **15**, 296.
- Zinc benzoglycollate, **5**, 77.
- Zinc chloride, action of, on butylic alcohol, **8**, 256.
- action of, on morphine, **24**, 264.
- action of, on papaverine, **24**, 265.
- compound of, with diplos-ammonium chloride, **5**, 217.
- double salt of, with dipyridine, **22**, 411.
- reaction of, with nitrite of ⁸ amyl, **20**, 579.
- Zinc diethoxalate, **22**, 36.
- Zinc dinitroethylate, **11**, 84.
- Zinc dinitroethylate and zinc-ethyl, **11**, 83.
- Zinc dinitromethylate, **11**, 89.
- Zinc disulphomethiolate, **9**, 246.
- Zinc ethonide, **1**, 151.
- Zinc ethylotithronate, **10**, 58.
- Zinc glycollate, **5**, 80.
- Zinc iodide, compound of, with diiodide of ethylene-hexethyl-diphosphonium, **14**, 102.
- Zinc iodide, compounds of, with aniline and toluidine, **25**, 249.
- compound of, with oxide of triethylphosphine, **13**, 296.
- Zinc leucate, **14**, 311.
- Zinc malates, **1**, 32.
- Zinc methylodithionate, **10**, 245.
- Zinc organo-compounds, properties and reactions of, **13**, 194.
- Zinc oxide, artificial formation of crystalline, **1**, 42.
- quantitative separation of, from potash and soda, **2**, 99.
- specific gravity and atomic volume of, **III**, 81.
- twin-crystal of, **25**, 294.
- Zinc phosphite, **20**, 369.
- Zinc pyrophosphotriamate, **19**, 9.
- Zinc salts, osmose of, **8**, 89.
- Zinc selenites, **2**, 65.
- Zinc selenocyanate, **4**, 19.
- Zinc sulphate, diffusion of, **4**, 95.
- Zinc sulphide, specific gravity and atomic volume of, **III**, 88.
- Zinc thiophosphodiamate, **18**, 4.
- Zinc and copper, alloy of, Cu_3Zn , **24**, 1167.
- alloys of. See Brass.
- sulphantimonate of, **6**, 140.
- Zinc and silver, thermo-electric properties of, **3**, 309.
- Zinc and sodium sulphate, measurement of the crystals of, **III**, 391.
- Zinc and sparteine, chloride of, **15**, 5.
- Zinc and sparteine, iodide of, **15**, 4.
- Zinc-amyl, **17**, 33.
- formation of, **13**, 180.
- Zinc-amylum, **6**, 64.
- Zinc-compounds of the alcohol-radicals, reaction for the production of, **17**, 29.
- Zinc-ethyl, action of, on binoxide of nitrogen, **11**, 80.
- action of, on ethyl borate, **15**, 367.
- action of, on butyl iodide, **25**, 1092.
- action of, on ethyl oxalate, **22**, 29.
- action of, on nitrous and nitric ethers, **21**, 174.
- action of, on monobromethylene, **20**, 28.
- action of phosphine on, **24**, 568.
- action of terechloride of phosphorus on, **11**, 59.
- formation of, **13**, 178.
- formation of, by the action of mercury and zinc on sodium-ethyl, **19**, 129.

Zincethylum, **6**, 64.

Zinc-methyl, action of, on biniodide of trimethylsilane, **13**, 119.

—— — action of, on binoxide of nitrogen, **11**, 88.

—— — action of, on borate of ethyl, **15**, 375.

—— — formation of, **13**, 126, 180.

—— — preparation of, **13**, 124.

Zincmethylum, **6**, 63.

Zinc-monethyl and zinc-monomethyl, **22**, 34.

Zincoferrous sulphate, **23**, 1079.

Zinc-white, analysis of, **24**, 762.

Zircon in hypersthenite, **24**, 205.

Zirconia crystallised from borax, **24**, 804.

Zirconia, specific gravity and atomic volume of, **11**, 93.

Zirconium, detection and estimation of, in tantalites and columbites, **25**, 195.

Zirconium, spectrum of, **24**, 1147.

Zirconium oxychloride, **24**, 100.

Zirconium selenites, **2**, 68.

ERRATA.

page.	line.	column.	
65	31	2	for 302 read 32.
68	28	2	„ 70 „ 30.



QD Chemical Society, London
 1 Journal
 C6
 Index
 1841-72
 cop.4

1841-72
 App'd 1841
 Serials

PLEASE DO NOT REMOVE
 CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY

